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QUEENSLAND AGRICULTURAL JOURNAL

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Event and Comment.

The Current Issue.

BUOYANCY of spirit and a general air of quiet and firm confidence in Queensland and its future were marked characteristics of the huge daily crowds at the Brisbane Exhibition, and something of that spirit of sane optimism was captured by our camera, as will be seen by our Show report, necessarily condensed, in the current issue. Pictures of the winners in the live stock competitions have been reserved for our October number. Pressure on space has also compelled the holding over of the third instalment of Mr. Currie's paper on The Brown Cut Worm, which will appear in our next issue. Mr. Easterby continues his interesting narrative of the development of the Queensland sugar industry, and the sugar section is otherwise well supplied. Tomato-growing in North Queensland is the subject of a short note by Mr. Duffy. The officers of the Fruit Branch have also contributed a valuable illustrated article on tomato culture, grading, and packing. Mr. Hardy, a well-known Northern horticulturist, contributes a brief account of his fruitgrowing experiences at Herberton. Results of a poultry-feeding test at Mount Gravatt are given, while Coccidiosis in Chickens is dealt with in a well-illustrated article by officers of the Poultry Section. Prospects of tobacco-growing in North Queensland are noted briefly. Plant breeding experiments at the Roma State Farm are described by Mr. Soutter. Mr. Shelton has a useful compilation on pig diseases, illustrated by two excellent black and white drawings by Mr. Helmsing, as well as numerous photographs. The art of rose culture is discussed by Mr. Heers in the Home and Garden Section. Other regular features of this month's Journal are well supplied with a wide diversity of interesting information.

The Royal National Association.

THE story of the Royal National Association was presented in concentrated form at its Fifty-fifth Annual Show at Brisbane last month. Probably no other institution has had a greater influence on the remarkable development of our rural industries, especially in the last twenty years. To what degree its useful purpose to Queensland has been proved can hardly be realised adequately; to what extent it will continue to radiate its influence and how far it will develop its greatness as a factor in the brightening and prospering of country life can be imagined more readily. For is not the Brisbane Show itself extraordinary evidence of the energy, the enterprise, and the vitality of rural industry that it is the Association's job to develop, and upon which rests the soundness and completeness of our existence as a nation? The Association has had the good fortune to have big men at the head of its affairs. It is no wonder, therefore, that it is a fountain of progressive ideas and a strong educational force. And that, no doubt, is the reason why it is never guilty of taking a narrow view nor of pessimism in any of its constrictive or depressing forms. It stands for better farming, better stock, better business, bigger returns to the man on the land, and higher service to the State. The Brisbane Exhibition in its comprehensiveness and completeness was an impressive example of the high standards the Association has set, as well as of the immense value of its national service.

The Brisbane Show—A Great Education.

WHEN asked to give some of his impressions of the Show, His Excellency the Governor, Sir John Goodwin, said that one strong impression was the friendly relations existing between all exhibitors, despite what were termed the hard times for the country. There was a magnificent display. It was the fourth Show he had seen, and on each occasion there had been a big improvement. Sir John was impressed with the advancement shown in the beef and dairy cattle, especially with the high standard of the Hereford and Shorthorn breeds. "The dairy cattle are simply splendid," he added. "I have seen the Illawarras, Jerseys, Guernseys, Ayrshires, and other breeds, and have noticed their superior quality. I observed that both the big breeders and the smaller breeders have carefully selected their animals, and are maintaining a standard of the highest quality."

Speaking of the meat exhibit, His Excellency said he regarded it as one of the highest value in the Show. He could see that the best and most scientific methods were being followed to produce beef of the best quality.

Referring to the district exhibits, the Governor remarked: "I regard them of the utmost importance, and they convey to me an impression that will be always remembered as proof of the greatness of the country." He had yet to have a close look at the fruit and one-farm displays, observing that he had been at the Exhibition every day, but there was so much to observe that all could not be seen in the four days that he had been at the grounds.

"The National Association," continued His Excellency, "is doing valuable work for the whole of the State, and, as the people in the cities have not the opportunity to visit the country except for short periods, the Association is bringing the value of the country under the notice of the cities. There is an immense educational value to the younger generation and to the elder people, who can learn something from every day that a visit is made to the Exhibition, for by daily intercourse there is an interchange of ideas which must be of benefit to the individual and the people of the State generally. I am struck by the friendly spirit amongst all people."

The Council of Agriculture—Organised Marketing.

SPEAKING on the occasion of his unanimous election to the Presidency of the Council of Agriculture, the Minister for Agriculture and Stock, Mr. Harry F. Walker, said that in accepting the position he recognised that it brought greater responsibilities to his shoulders because of the great amount of work performed by the Council of Agriculture. During the past twelve months he had watched their work as

closely as his time permitted. In his travels he gained much information about the problems they had to face. As a result he had been particularly keen in furthering the interests of the Council.

He looked upon organised marketing as the most satisfactory way of disposing of the surplus products of the State. He had heard it stated that the cost was too great, but those critics would be surprised if they saw actually what the cost was. Under organised marketing there was only one conclusion—that the farmer was better off now than ever in the history of Queensland. Organised marketing started in Queensland, and New South Wales and Victoria had followed suit by forming boards to control products. South Africa was also adopting the system, and in Great Britain a similar movement was on foot.

He as Minister considered that the executive committee and boards were doing good work. He praised their work and that of the secretary of the Council (Mr. C. Sheehy).

During the year he saw the need for the control of the maize crop, and he had decided to convene a conference of those interested to determine the policy of maize-growers. When a pool had been suggested previously there was opposition to its formation. The formation of a pool was of great importance to Queensland. He was also prepared to give consideration to the bacon people who were making an effort to place their industry on a better footing.

Mr. Walker congratulated the primary producers on the success of their year's work, and commended the spirit of co-operation that they had manifested, not only among themselves but with the Government, which viewed their efforts sympathetically and desired to help in every practical way in the solution of their pressing problems.

Room for Rural Expansion.

IN the course of a notable speech on the Address in Reply in the State House, the Minister for Agriculture and Stock, Mr. Harry F. Walker, reviewed the whole of the activities of his Department in their relation to the definite progress made by the primary industries during the year. Referring to the room for tremendous expansion that exists in our rural industries, he said:—

> When we speak of increased production we must first aim in the direction of inducing people to go upon the land, and to do so we must make conditions attractive not only for the older members of the community but particularly for the younger people, who have a right to enjoy the ordinary amenities of modern social life. If we have the courage to face realities, then we shall be able to overcome our present difficulties. That end can be achieved only by setting aside party politics for the time being, although I should like to see party politics abolished for all time. We should work with the one common object of saving one of the greatest countries of the world. The prosperity of the State is bound up with the prosperity of the primary producer.
>
> . . . . In Queensland we have wonderful primary industries, from sugar in the North to fruit in the South, varying with climatic conditions possible only in a tropical and sub-tropical country like our own. With these industries in mind, one can only come to the conclusion that there is vast room for the development of these industries, particularly in view of the statements made by hon. members representing rural districts who have fully backed up my opinion in this regard. I am satisfied that we could launch out in many directions as we have never done before.
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> . . . . . At this stage of our national development I cannot stress too strongly that the wellbeing of the Commonwealth is bound up in agricultural and other rural pursuits. The only sound way to secure continued increase in production is to improve farming methods, to eliminate the hazards of rural enterprise, and to apply the lessons of science to every branch of production. It has been said that every extra bushel of wheat per acre taken from the soil is worth £3,000,000 to Australia. Every insect and vegetable pest we learn to control saves enormous financial loss. Every application of new knowledge to pasture and soil management and animal husbandry means an immense amount of added wealth to the country.

THE QUEENSLAND SUGAR INDUSTRY.

By H. T. EASTERBY, Director, Bureau of Sugar Experiment Stations.

PART IX.

(b) Review of the Industry since Federation.

(*Continued.*)

IN 1913 the wet season was a particularly heavy one, and caused a number of floods in the sugar districts between Cairns and the Herbert River. The losses in the Innisfail district were severe, and many areas of land on river banks were washed away and a number of buildings destroyed. In some instances large quantities of sand and gravel were washed in from the rivers, causing much loss to canegrowers of valuable land. Floods, too, occurred in parts of the Cairns and Herbert River districts, though the damage was not so great. Floods were also experienced in the Baffle Creek and Bundaberg areas. In spite of these unfortunate happenings the 1913 crop was the largest to that date, amounting to 242,837 tons, the previous record yield being 210,756 tons in 1910.

The introduction of motor tractors began about this period, but they were looked on then as more or less of an experiment. Favourable reports, however, were given of their work, and they commenced to rapidly increase in numbers in the succeeding years.

During this year an effort was made by Messrs. Rankin, Swayne, and Caine, M's.L.A., representing the sugar constituencies, to have a Sugar Cane Price Boards Bill passed. It was not a Government Bill, and as a whole the Government did not support it, though the Opposition did. On the question that the Bill be read a second time, the voting was thirty-one in favour and twenty-eight against. The Bill, however, was not further proceeded with, which created much disappointment to many growers at the time. During the following year (1914) the Macnaughton Award in relation to labour in the cane fields caused commotion, and materially increased the cost of production. This Award and succeeding ones will be referred to in later sections.

Another Act in relation to sugar-mills was passed this year, but it was one that so far has never been made use of. This was an Act to provide for the establishment and management of co-operative sugar-mills. It provided that the Government might lend a sum equal to two-thirds of the capital cost of any sugar-mill to be purchased or built by a co-operative company for a term of twenty-one years bearing interest at 4 per cent. per annum.

At about the time the Act was passed one or two groups of farmers thought of purchasing or establishing sugar-mills, but such schemes never came to fruition. In one case a large milling interest, which considered their cane supply would be interfered with, purchased a lot of the land where it was proposed to run tramlines, and so put a "sprag" in the project, from which it never recovered.

At the end of 1913 the Sugar Experiment Station at Bundaberg was established.

The year 1914 was chiefly noteworthy for the outbreak of the great European War, which was destined to affect the sugar industry in no small degree amongst many larger issues. This subject, however, will

be dealt with in a later article relating to prices for sugar. At present it is sufficient to say that the enlistment of men from the sugar districts was considered to be the highest in Australia, as it has been stated that one in eight of the population enlisted. This amply bore out the Federal Royal Commission's support for the industry from a defence point of view.

The price for sugar was so low in 1914 that in some districts farmers for a time actually went in for a "strike" for an increased rate in the price to be paid for cane. The matter was settled, but it was an indication that farmers expected better treatment. Farmers at that time were faced not only with higher costs of production but with the increase that had been going on in the cost of living and the purchase of farming implements and materials.

It was about this time, too, that the influx of Italians into the industry in parts of North Queensland began to arouse more attention. The sale of a large number of farms in the Ingham district to Southern Europeans was taking place, whose standard of living was below our own at that time.

A most severe drought affected the cane areas in 1915, more particularly those south of Townsville. The Lower Burdekin district was particularly hard hit, especially on the Inkerman side of the river, where there was no irrigation at that time, and where hundreds of acres of cane died right down to the ground. The Inkerman Mill did not crush, and the Pioneer and Kalamia Mills had only small crops. The total yield of sugar for the State was 140,496 tons, compared with 242,837 tons in 1913 and 225,847 tons in 1914, and the shortage in the sugar crop was estimated to be about 114,000 tons compared with the consumption. As in the 1902 drought, written of earlier in this history, large quantities of cane were sold for forage purposes.

Acts affecting the industry passed this year were of a highly important nature. The first was the Sugar Acquisition Act to ratify the compulsory acquisition of raw sugar which had already been proclaimed, and the other the long expected Regulation of Sugar Cane Prices Act. Both of these will be referred to in later articles.

A Royal Commission on a phase of the industry sat during 1915. This was appointed to ascertain whether dissatisfaction existed in connection with the working of Central sugar-mills at Mackay, to suggest remedies for the removal of same, to recommend a method whereby the mills may be worked by suppliers of cane on the co-operative principle, and to make suggestions with reference to the compensation that should be given to merely land-owning shareholders who were not suppliers of cane to the mills. This Commission took evidence in relation to the Plane Creek, Pleystowe, and North Eton Mills. Dissatisfaction did exist at that time, but the subject was one of local interest, and the difficulties that were present then have since apparently been overcome.

The following year (1916) the once famous Dickson Award for sugar-workers created a tremendous stir amongst the millers and growers. The majority of the mills below Townsville closed down by way of protest, and several remained closed for a period of two months, while three did not crush at all. The mills above Townsville, however, did not close, the various managements stating that they were unable to do so.

During this year a Board of Inquiry on the sugar industry was appointed by the Queensland Government. The Board consisted of

W. J. Short (Chairman), M. B. Salisbury, and the writer, and the matters upon which they were to report were as follows:—

(1) The position of the industry in Australia with regard to the possibility of over-production;
(2) The wisdom of establishing additional mills;
(3) In the event of additional mills being recommended, the most suitable localities for same.

As was the case with the 1911 Commission, a number of applications had reached the Government for the erection of more Central mills. These were as under:—

(1) Cooktown;
(2) Bailey Creek, to the north of the Daintree River, between Port Douglas and Cooktown;
(3) Atherton;
(4) Freshwater (Cairns);
(5) Daradgee and South Russell (including the coastal lands lying between the Russell River on the north and the Johnstone River on the south);
(6) Banyan, Hull, and Tully Rivers;
(7) Long Pocket (Herbert River);
(8) Haughton River (29 miles from Townsville, on the North Coast Line);
(9) Silent Grove (Mackay);
(10) Yeppoon (Rockhampton);
(11) Rockhampton;
(12) Alton Downs (Rockhampton);
(13) Jardine (North Coast Railway, 21 miles north of Rockhampton);
(14) Stanwell, Woodend, and Bushley (22 miles west of Rockhampton);
(15) Mount Larcom (47 miles south of Rockhampton, on the North Coast Railway).

The Board visited all the above districts, held thirty-five sittings in twenty-two different centres, and examined 142 witnesses.

The following is a summary of its findings:—

Question I.—The mills now in operation, with the assistance of South Johnstone, are capable of producing 355,000 tons of sugar in a season, and the Commonwealth consumption is 260,000 tons, with a yearly increase of some 5,000 tons, so long as the population maintains the present rate of progression. If sufficient cane were forthcoming to keep all the mills fully occupied, there would be an over-production of some 95,000 tons per annum; but, as the maximum yield in any one year so far has only been 265,000 tons, and Babinda, South Johnstone, and Inkerman Mills are capable of producing another 45,000 tons, there is no reason to anticipate a yield of more than 310,000 tons, increasing to 315,000 tons when the projected additions to existing mills are completed. It is consequently certain that, with the first season as good as that of 1913,

we shall be faced with over-production, though the steady increase in population year after year from natural causes will tend gradually to diminish the amount of such anticipated surplus.

Question II.—It would be unwise for the Queensland Government to erect additional sugar-mills at the present time and under present conditions. With some assurance of adequate protection, assuming that the policy is adopted of producing enough sugar to supply the consumption of Australia in years with average crops, then provision must be made about the year 1920 for an annual increase of 5,000 tons.

Question III.—When the time arrives for further mill construction, the applications submitted to us should receive consideration in the following order, subject to the provisos to be found in the summary at the end of Part III. of our report:—

(1) Banyan, Hull, and Tully Rivers;
(2) Bailey Creek;
(3) Daraji, South Russell, and Babinda;
(4) Freshwater;
(5) Long Pocket.

The provisos mentioned were—

(*a*) Bailey Creek.—If a survey by an engineer proves that satisfactory tramway connection at a reasonable cost can be made with the Daintree River lands over Thornton Range;

(*b*) Daradgee, South Russell, and Babinda.—If when the time arrives for dealing with this application it has been ascertained that the South Russell lands are not required by the Babinda Mill.

Up to the time of writing nothing further has been done in connection with the Bailey Creek lands, while the Daradgee, South Russell, and Babinda lands are now supplying the Babinda Mill.

The Freshwater proposition has also dropped out, the cane from there being supplied to the Hambleden Mill. The erection of the Central Mill at Tully will be dealt with later.

The idea of building a mill at Long Pocket, near Ingham, crops up every now and again. The Haughton River is now served by a mill that was transferred from Invicta, near Bundaberg; while the Rockhampton, Cooktown, and Atherton proposals are at the present time practically dead, and the Silent Grove lands, near Mackay, have now been opened up and supply cane to Farleigh Mill.

The sugar industry was still passing through a critical period in 1917, though the agreements between the Federal and State Governments had counteracted the effect of the Victorian and New South Wales Prices Boards in reducing the price of sugar.

Due to several of the mills being closed in 1916, as already mentioned, for a period of some two months, there was a large crop of standover cane in 1917, and this, with the return of good seasons after the 1915 drought, created a large crop of cane to be crushed, the largest ever handled to this date. Most of the mills made an early start, and for a while everything went on well. Then a big strike took place in the Southern States, which held up regular supplies of bags and lime, and prevented the sending of ships for the conveyance of sugar to the refineries. The district of Mackay, then not connected by rail with the

South, suffered most owing to its harbour disadvantages, and the mills had to close on two occasions for several days for want of sugar bags. Due to the transport of sugar being held up, every wharf and store in the sugar areas became congested. Many mills were compelled to add to their storage accommodation at a time when galvanised iron and timber for building purposes was almost unprocurable, and both at a very high price. A few of the Northern factories were obliged to store sugar within the mills, and the loss which ultimately ensued from the double handling required, payments for insurance and storage, and the deterioration of the accumulated sticks during the following wet season, was very high. The Lower Burdekin district did not commence crushing till late, and a good deal of cane had to stand over. The industrial troubles spread from the South to the North, and railway disturbances took place in North Queensland. The year generally, however, was particularly favourable to the growth of cane, and the yield of cane and sugar per acre has never yet been exceeded. The figures are as under:—

Year.	Tons of Cane Per Acre.	Tons of Sugar Per Acre.
1917	24·88	2·83
Average, 1909 to 1918	17·52	2·01

It is remarkable that we have never experienced another year like 1917, when the crops were excellent in all areas except the Logan. The leading district was the Lower Burdekin, which produced 37·77 tons of cane and 4·53 tons of sugar per acre. All natural conditions seemed to combine to produce big crops, and this supplemented by the large amount of standover cane accounted for the high returns per acre.

The yield of sugar in this year was 307,714 tons, constituting the record to date.

This good year from a climatic point of view was followed by a disastrous one, for in 1918 two of the severest cyclones experienced since Queensland was settled by a white population struck the coast causing serious loss of life and immense damage. The first of these two cyclones visited Mackay on 21st January, and was a terrifying experience to the inhabitants, a number of whom were drowned by the high tide, backed up by the cyclone which came up the Pioneer River and spread over a great part of the town. The force of the wind was tremendous, buildings were levelled, mills partly destroyed, telephone and telegraph lines blown over and inextricably tangled, and 6,000 tons of sugar stored at wharves and mills were totally destroyed.

The rainfall during the cyclone week was 63·13 inches, and for the month of January 85½ inches—much more than the average annual fall at Mackay. The news of this disaster did not arrive in Brisbane till the 24th January, and then only meagre particulars came to hand. On the 28th January, Brisbane papers stated that Mackay was in ruins, the buildings on Flat Top Island had been wrecked, and the light extinguished. Bad as the actual disaster was, it was greatly exaggerated at the time. One captain of a passenger boat passing Mackay wired to Brisbane that Mackay had been totally obliterated, and that nothing was left of the township. During this unfortunate occurrence twenty persons were drowned, buildings and churches were wrecked, the Sydney Street bridge was partly carried away—portion of it falling on the tender

Plate 56.—Effect of High Winds on Cane.

"Brinawarr." The tender "Tay" broke from its moorings, got under the bridge before it collapsed, and was deposited on the river bank some little distance inland. During the height of the cyclone the mercurial barometer at the Post Office was not read, but the barograph recorded 27·55 inches, the lowest ever recorded in Australia.

In addition to the 6,000 tons of sugar absolutely lost, a great deal on wharves and in mill stores was badly damaged, and this had to be reconditioned. Fortunately, the Commonwealth Government came to the rescue, and promised to bear any loss in connection with the sugar that had occurred. But for the shipping delays and strikes in 1917 the whole of the season's sugar would have been removed before the cyclone occurred, and this great loss would not have occurred. It should remain an object lesson on the advantage of the rapid transport of stocks of sugar before the wet season sets in. At the outset it was estimated that 30 per cent. of the sugar-cane in the district was irretrievably ruined, but the ultimate loss was much greater than this; nor did the land recover the effect of the very heavy rains for some two or three years afterwards.

As if all this was not bad enough, a furious cyclone again visited the coast, centring principally at Innisfail and Babinda. This took place on 10th March, 1918. These two townships were almost completely wrecked, and eight persons were killed at Innisfail. The cane was greatly injured, and beautiful scrubs in these districts were largely destroyed.

At this time the cane in North Queensland was much further forward than at the time of the cyclone in Mackay, and it consequently suffered a great deal more damage from the actual wind. Rain and floods also interfered with the cane from the Herbert River to Proserpine. The giant scrubs about Cairns were badly knocked about, tangled and blown over, so that instead of the impenetrable jungle that usually met the eye, it was possible to see through the scrubs for very great distances.

Much damage was also caused to the sugar-mills in these Northern areas.

All the cane in Queensland was light this year, even in the districts not affected by the cyclones.

A few of the smaller sugar-mills closed down about this period, such as Goodwood, Miara, Waterloo, Nerang, and Baffle Creek.

The initiation of the Sugar Experiment Station at South Johnstone, near Innisfail, took place this year.

The year 1919 was another dry period and the crops were light, the yield of cane and sugar being even below the previous cyclone years. A maritime strike took place also which again held up bag supplies and transport of sugar. Six sugar-mills did not crush, due to the dry season, and much of the crop in Southern districts was sold for forage purposes.

During 1919 the Invicta Mill, in the Bundaberg district, was removed to the Haughton River district, between Ayr and Townsville.

Manures were very difficult to obtain at this time, nitrate of soda and sulphate of potash being unprocurable. Muriate of potash started to come into Queensland for the first time in any quantity, and soon began to be used in mixed fertilisers.

A second Federal Royal Commission was appointed this year, consisting of A. B. Piddington, N. C. Lockyer, and S. Mills. They were given a large number of questions to investigate, such as the natural

value of the industry, comprising acreage, capital invested, number employed, wages, production, Government control, protection, beet sugar, and Empire preference.

This Commission took a considerable time to carry out its investigations, and had to obtain three extensions of the period in which they were to make their report. The Commission was not of the same calibre as the first Federal Royal Commission, and proceedings were conducted on a free and easy plan—a go-as-you-please style—with everybody interrogating, so that questions and answers occasionally got mixed up in the report of the evidence which was not published in question and answer form, but in narrative fashion. The Commission sat into 1920. Persons outside the Commission were allowed to travel around with the members and to put questions to witnesses, very often in the middle of the Commissioners' own questions. The report ran into fifty-six pages, and the evidence to another 600 pages.

The Commission made a number of recommendations, including the general control of the cane sugar industry by the Commonwealth exercised through a body that might be called the Commonwealth Sugar Control, consisting of three Commissioners, and that an increase in the price of raw sugar from £21 to £22 per ton would be justified. This last recommendation would have given little satisfaction to the industry, but as a matter of fact the whole report fell dead on the action of the Prime Minister (Mr. W. M. Hughes) in materially enhancing the price in 1920 without any reference to the findings of the Commission.

The Commission's report was dated 27th February, 1920, and we may now go on to that year.

For some time past sugar-growers and millers felt they were being treated unfairly in the matter of price, and a conference took place at the Department of Agriculture early in 1920. At that conference it was decided that a deputation should wait on the Prime Minister of the Federal Government and request that the price of sugar should be increased from £21 to £30 6s. 8d., and that an agreement to that effect be made for a period of not less than three years. This deputation proceeded to Melbourne and afterwards met in Sydney with representatives of the Queensland and Federal Governments and other branches of the industry. The Prime Minister finally acceded to the request under certain conditions, which will be dealt with in a succeeding article dealing with the history of the course of prices.

The drought which affected the crop in 1919 persisted into 1920, February and March being abnormally dry. This following on the severe dry weather experienced in October, November, and December of the preceding year considerably shortened the crop, and though it recovered to a great extent above Townsville, it was unable to make any such recovery in Southern Queensland, where the crushing was again a small one.

A cyclone was experienced at Mossman in the early part of this year, which did a great deal of damage to cane and farmers' dwellings.

In the year 1921 the industry was blessed by a good season, and this fact, combined with the better price for sugar, gave a great impetus to sugar-growing in the following years. The rainfalls at some of the far Northern sugar areas were particularly heavy, and it was at this time that a beginning was made of opening up further new areas of

land for canegrowing to supply existing mills. Improved railway communications assisted matters, the line from Brisbane to Mackay being opened for traffic in September of this year. This led to considerable settlement to the south of Mackay for sugar-growing. The yield of sugar this year, though it did not come up to 1917, was the largest since that date—viz., 283,198 tons of sugar.

It was felt at this time that this rich tropical belt of fine land, comprised in the Banyan and Tully areas, between Cardwell and Innisfail, should be opened up for sugar-growing. The settlers in that district had taken up a good deal of the land in the hope that a mill would be erected, and it was one of the locations included in the recommendations of both the 1911 and 1916 Commissions, standing first on the list of the latter. The steps taken towards the erection of the Tully Mill will be dealt with in the next section.

[TO BE CONTINUED.]

Bureau of Sugar Experiment Stations.

CANE PESTS AND DISEASES.

WIREWORM DAMAGE.

In connection with the considerable damage to cane caused by wireworms in the Mackay district, the Assistant Entomologist, Mr. R. W. Mungomery, recently visited that district, and in reply to inquiries as to advice on this subject has submitted the following notes to the Director of Sugar Experiment Stations, and these notes are now made available for publication:—

From information gathered during the course of my recent investigations on the wireworm pest in the Mackay district, it seems that the life cycle of the insect which is responsible for the greatest amount of damage there is of at least a year's duration or more, and moreover, the period of oviposition of the adult beetles or "click beetles," which are responsible for the appearance of wireworms, appears to be a very protracted one. From this it will be evident that the pests are active over a considerable portion of the year, and there appears to be no quiescent period during the time when the greater part of the cane planting is carried out in the Mackay district. For this reason, no safe planting time can be recommended. At best, one must endeavour to plant during the warmer months of the year—i.e., early planting in March or April and late planting in August and September.

In combating wireworm attack, the essential point to keep in mind is to get the plants away as quickly as possible, and any means that will bring about this desirable end should be employed. By planting, therefore, in these warmer months, every encouragement is given for the plant to strike quickly, maintain its rapid rate of growth, and soon get past the critical period during which it is liable to injury. To plant in June and July in land where wireworms are suspected of being present is usually disastrous, for at such times plants are very slow in coming away, and are much more liable to injury.

Wireworm attack is most severe on low-lying land which is poorly drained, and which, in consequence, remains wet and cold. On this type of land more attention should be paid to bedding, and the water furrows deepened sufficiently to allow the water to flow off as quickly as possible. Though it is wise to drill fairly deep furrows when lining out at the time of planting, only a small amount of earth should be filled in as a covering for the plants, and this will facilitate rapid germination.

Good thick plants, of vigorous growth, should be used, and spacing should be close, so that if one plant is damaged, and a miss results, blank spaces between stools will not be so great.

After these precautions have been taken, it may still be found that wireworms are responsible for sufficient damage to cause annoyance. Obviously it is futile to soak the cane set in any poisonous solution, in the hopes of poisoning the pests, for this solution merely protects the set and not the growing shoot, which is the portion mainly attacked. The reputed remedy of using basic superphosphate in the drills at the time of planting seems to have yielded no results to substantiate the claims made for this fertiliser in this connection. The use of sulphur mixed in with other fertilisers likewise appears to be a failure in preventing attack.

Recourse must then be had to the use of some repellent, and experiments have been laid down on certain farms in the Mackay district, using the following chemicals:—

(1) Crude naphthalene sprinkled in the furrow just above the plant, at the time of planting and at the rate of one-eighth ounce to each cane set.

(2) The above quantity of naphthalene mixed with eight to ten times its weight of burnt lime and applied similarly to the former. The lime is used as a diluent, and also with the object of keeping the ground more open and allowing a better vaporisation of the naphthalene.

(3) Dropping orthodichlorobenzene at regular intervals in the drills at the time of planting.

Although it is premature to discuss the relative value of the above chemicals in warding off wireworm attack, it is hoped that some measure of relief will be gained from the results of these experiments, and farmers are advised to follow along the lines suggested above. Crude naphthalene is obtainable from Taylors and Elliotts Ltd., Charlotte street, Brisbane.

The use of burnt lime at the rate of 30 cwt. to 2 tons per acre also appears to have yielded lasting results. The lime should be applied before the second or third ploughing. It is not claimed that the burnt lime will have any immediate insecticidal action, but it renders the soil in better physical condition, and whether or not it has any other effect on wireworms is not yet quite clear; however, evidence points to the fact that cane planted on land treated with burnt lime has suffered no damage and excellent crops have resulted. Growers would be well advised to give this treatment a thorough trial in a small way.

ENTOMOLOGIST'S ADVICE TO CANEGROWERS.

By EDMUND JARVIS.

Growers who are contemplating fumigating their cane next year to control grubs should order their materials early, as there is a very large demand for these materials, and Australian stocks are limited. The order should be placed early enough for a supply to come from England should the agents not have enough on hand to fulfil requirements.

Names of firms supplying the necessary fumigants are available on application to the Bureau, and, if possible, it is better for growers to obtain fumigants through their local board or association, as most firms offer a reduction in price for large quantities.

Neither paradichlorobenzene nor carbon bisulphide deteriorate in any way as long as they are kept closed up in their original containers, so it is far better to order early than to wait till grubs appear on the farm and then be disappointed because fumigants are unobtainable.

Army Worms.

Towards the end of September invasions by the army worm or plague caterpillar are very common, and in order to combat these pests farmers should keep on hand a spray pump of the knapsack type and supplies of lead arsenate and Paris green. Directions for poisoning army worms have been published at frequent intervals, and assistance or advice may always be obtained by applying to the Meringa Experiment Station either by letter or telephone.

The main essential in dealing with army worms is for remedial measures to be adopted at once, as caterpillars are capable of stripping the foliage from a whole field of cane within a few days, and, although the cane will recover, yet it suffers a very severe check from the loss of leaves.

The "Frenchi" Grub.

Grubs of the "frenchi" cane beetle, which have been deep down in the ground for some weeks, will commence feeding again shortly, and patches of wilting cane will mark their appearance. The work of this grub almost always occurs in patches, and when these are noticed it is a good plan to fumigate stools in the neighbourhood of the damage.

Carbon bisulphide is very effective for poisoning "frenchi" grubs, and particulars of its use in that connection are published in pamphlet form by the Bureau.

Owing to the winter rains experienced throughout the North this year, these grubs will probably be much in evidence, but the amount of damage caused by them will be considerably lessened should further rains occur during September and October.

Moth Borers.

Headlands should be cleaned up as far as possible in order to minimise the damage caused by moth borers. The typical damage caused by these caterpillars consists of "deadhearts" in the cane, although sometimes they tunnel in the base of large sticks of cane. It is nearly always in close proximity to a dirty or grass-grown headland that the damage occurs, hence the advisability of keeping headlands clean and free from weeds.

General.

The liability of damage by quite a number of pests, including borers, grubs, and wireworms, can be lessened by regular cultivation of the inter-rows, and this point cannot be too strongly emphasised.

QUEENSLAND'S SUGAR PRODUCTION.

The Registrar-General, Mr. George Porter, has issued the following bulletin:—

On the 16th December, last year, an estimate of the probable result of the sugar crop for the 1929 season was issued from this Department. It was then calculated that there would be 508,332 tons of sugar made at 94 net titre from 3,592,189 tons of cane.

Final figures show that thought the tonnage of cane (3,581,265) was less than the estimate, the quantity of sugar made at 94 net titre was 518,516 tons, or 10,184 more than the preliminary figure.

In 1928 the production of sugar at 94 net titre amounted to the record figure of 520,620 tons, which is 2,104 tons more than in the 1929 season. However, the 1929 yield is the next highest ever recorded in this State.

Thirty-five mills again operated during the year, and the particulars of the output in each sugar-growing district of the State is shown hereunder, figures also appearing for several previous years:—

Division.	Tons of Sugar Made at 94 Net Titre.				
	1925.	1926.	1927.	1928.	1929.
Rockingham	216,755	221,104	228,839	255,188	273,820
Edgecumbe	171,511	117,807	170,596	184,343	173,454
Wide Bay	85,360	42,669	78,757	75,850	63,287
Moreton	11,959	7,692	7,553	5,239	7,955
Total State ..	485,585	389,272	485,745	520,620	518,516

Note.—It should be here explained that though the total tonnage of cane crushed and sugar made as shown for the State are final figures, the totals for the divisions for the year 1929 are liable to revision; figures for previous years are final in every case.

The figures quoted in this Bulletin for 1929 for divisions or districts show the actual quantity of cane crushed and sugar made at mills in each division, whether the cane was grown in that division or not. When complete statistics of the sugar industry are available it is possible to allot the cane crushed to the division in which it was grown, and a corresponding transfer of sugar is then also made.

Final figures will appear in the printed report of the Registrar-General on agricultural production. They will probably show a still greater increase in production in Rockingham and a still greater decrease in Edgecumbe when compared with 1928 production.

It will be noted that though the total production decreased in 1929, there was an increased output in the far Northern District (Rockingham) of 18,632 tons compared with 1928, and also of 2,716 tons in the Southern District of Moreton. These increases were, however, more than counterbalanced by a decrease of 12,563 tons in the Wide Bay divisions, and 10,889 in Edgecumbe. The percentage of the total production in each division was—Rockingham 52.81, Edgecumbe 33.45, Wide Bay 12.21, Moreton 1.53.

The weight of cane crushed during the last five seasons, together with the area from which such cane was taken was—

Year.	Tons of Cane.	Acreage.
1925	3,668,252	189,466
1926	2,925,662	189,312
1927	3,555,827	203,748
1928	3,736,311	215,674
1929	3,581,265	*223,730

* *Note.*—The acreage for 1929 is an estimate made by the mills only, the final figures from the Agricultural Collectors' books will not be available for about a month.

The yields per acre for the 1929 season were 16.01 tons of cane and 2.32 tons of sugar at 94 net titre, but these figures are liable to revision when the final figure for the area crushed is available.

The average tons of cane required to make one ton of sugar were 6.91 compared with 7.18 in the previous year.

Similar figures showing the percentages in each district in 1929 were—

District.	To Each Acre Crushed.		Tons of Cane to Make one Ton of Sugar.
	Tons Cane. *	Tons Sugar. *	
Rockingham	19·49	2·91	†6·70
Edgecumbe	14·18	2·09	†6·78
Wide Bay	12·01	1·49	†8·05
Moreton	14·40	1·89	†7·62
Total State	16·01	2·32	6·91

* Based on mill estimates of acreage only.

† Liable to revision.

Percentages for five years for the State were—

Year.	To Each Acre Crushed.		Tons of Cane to Make One Ton of Sugar.
	Tons Cane.	Tons Sugar.	
1925	19·36	2·56	7·55
1926	15·45	2·06	7·52
1927	17·45	2·38	7·32
1928	17·32	2·41	7·18
1929	*16·01	*2·32	6·91

* Based on mill estimates of acreage only.

It will be noted that the sugar content this season was highest in the Rockingham (far Northern) district, followed in order by Edgecumbe, Moreton, and Wide Bay. The average sugar content for the State was higher than in any previous season.

The tonnage of cane required to make one ton of sugar has gradually decreased from 9.44 in 1900 to 6.91 in 1929, due both to improvement in cane varieties and higher efficiency in sugar mills. The following figures will illustrate the downward trend:—

Year.	Tons of Cane to Make One Ton Sugar.
1900	9·44
1905	9·27
1910	8·73
1915	8·20
1920	8·00
1925	7·55
1929	6·91

During the twelve months ended 30th June, 1930, approximately 180,694 tons of sugar were exported direct overseas from Queensland, the value of same being set down at £2,194,245, or approximately £12 a ton. This valuation has been made on overseas realisation prices and not on the local price, which is approximately £26 per ton. Previously the value of overseas exports of sugar has been been shown in export statistics on the basis of the Australian price. In 1928-29 198,120 tons were exported, the value on the basis of the Australian price being £5,189,752.

The value of cane crushed in 1928 was estimated to be £7,209,778, while the value of the output of sugar mills in 1928-29 was £10,810,466.

Sufficient data is not yet to hand to value the cane crushed in 1929, and manufacturing statistics for 1929-30 are only now being collected. Therefore, later figures are not available, but as the quantity of cane crushed in 1929 and the production of sugar therefrom was somewhat lower it may be assumed, seeing that the price obtained overseas was probably lower also, that the values will be less than those quoted for the previous year in each case.

The production of sugar in Queensland per head of population, in 1929, was 1,256 lb. It is estimated that the consumption per head is about 120 lb., the balance being available for export to other States or overseas.

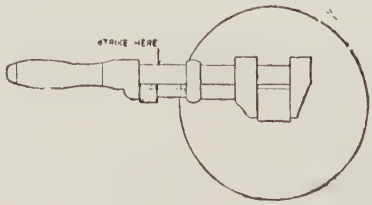
In addition to sugar made, the output of molasses from the mills during the year amounted to 15,861,948 gallons, which was disposed of as follows:—

	Gallons.
Sent to distilleries	5,638,465
Sold, &c., otherwise	215,933
Burnt	4,202,580
Food for stock	2,382,192
Used for manure	298,395
Run to waste	2,837,482
Held in stock, &c.	871,292

STARTING SCREWS.

IN CLEAN-OUT COVERS OF TRAPS.

Considerable difficulty, often-times, is experienced in starting the screws when



removing brass clean-out covers from traps. A good way is to give the wrench a few sharp strokes with a hammer at the point indicated in the sketch.

ROYAL NATIONAL EXHIBITION.

QUEENSLAND'S BOUNDLESS NATURAL WEALTH MIRRORED IN A GREAT SHOW—THE RESOURCES OF THE STATE ARRAYED IN FULL RANGE—A GENERATOR OF OPTIMISM AND AN EXEMPLAR OF OPULENCE—A FOUNTAIN OF PROGRESSIVE IDEAS—RIPE FULFILMENT OF EARLY PROMISE REVEALS A VISTA OF VASTLY GREATER ACHIEVEMENT IN THE YEARS AHEAD—THE VALUABLE WORK OF THE ROYAL NATIONAL ASSOCIATION—A COMBINATION OF COURAGE, INTELLIGENCE, INDUSTRY, AND ENTERPRISE.

Held on 11th August and following days, the Fifty-fifth Annual Show of the Royal National Association was an unqualified success from every point of view.

Every exhibit in the pavilion, paddock, and pen was an education, as well as evidence of high standards of skill, and of the wide field of opportunity and achievement that Queensland presents to the worker with hand and brain.

The Show represented an extraordinary diversity of production and rural interests, and from what was seen of the magnificent array of the products of Queensland industry it is hard to place a limit on any forecast of our future progress and prosperity.

In the ring stock were paraded in great numbers, and were never so uniform in quality.

The heavy horses, notably Clydesdales, showed no decline in breeding, condition, and schooling. Hunters, hacks, and remounts were remarkable for evidences of clean breeding and good training.

The cattle, both beef and butter, were splendid representatives of their respective breeds.

The pigs proved that the marketing lessons of the year had been well learnt, and that Queensland breeders are getting right away from valueless fat to lean meat baconers of early maturity and goodly weight for age.

Gathered together daily in the Grand Parade was as fine a collection of stock, for variety and quality, unexcelled in any show ring in the Commonwealth. The parade was a majestic spectacle, in which the monarchs of Queensland's pastures wore their honours royally and won the applause of a keenly critical crowd.

The 1930 Show stood as a working model of Queensland to-day, as a reflex of rural development, and as an epitome of industrial progress; it presented, in short, abundant evidence of all those things, spiritual as well as material, of which a nation is built.

THE OPENING CEREMONY.

DELIGHTFUL August weather, days of dazzling sunshine with a wintry chill still lingering in the shadows, favoured the Royal National Association for this year's Exhibition.

The Show was opened officially on Wednesday, 13th August, by His Excellency the Governor-General, Lord Stonehaven, accompanied by Lady Stonehaven, in the presence of an enormous gathering. Their Excellencies Sir John and Lady Goodwin assisted at the opening ceremony.

The Vice-Regal visitors were received by Mr. Ernest Baynes (President of the Royal National Association), who in the course of a cordial welcome said that in this year's Show thousands of good agriculturists and leading stud masters had come forward in one great co-operative effort to display the true wealth of Queensland and other States of the Commonwealth.

PLATE 57.—ROYAL NATIONAL SHOW, BRISBANE, 1930. A PANORAMA OF THE ARENA.

"The district exhibits and Departmental courts," he added, "together with the displays made by the fruit district representatives, and the general display of agricultural produce, including that splendid exhibit of Warwick wheat, certainly provide our best exhibit in agricultural produce at Bowen Park.

"The dairy cattle show on this ground to-day must stand as the finest cattle show in the world, for there are no fewer than 807 animals stalled, and the competition right through the whole section is particularly keen. The scene at the judging ring when the classes for aged cows in milk were paraded was wonderful evidence of what has been attained in the breeding of high-class stock. The showing in stud beef and fat cattle is more representative than it has been for some years."

In conclusion, Mr. Baynes said the council had been pleased to continue throughout its every section an educative influence. They had planned that the Show should have the brightest possible aspect, and with it should provide a stimulation and reassurance of that confidence which they should all have in such a great country as this. They trusted that, with the closing of the Show, that reassurance would have been accomplished, that the immediate prospects would brighten, and that Queensland would continue onward in her march of progress.

In declaring the Show officially open, His Excellency the Governor-General (Lord Stonehaven) said he thanked the council most warmly for the kind welcome which they had given to Lady Stonehaven and himself. "We are delighted," he added, "to be present with you on a day which is so fittingly set apart as a public holiday. Your Exhibition affords abundant and appropriate cause for rejoicing, and it is a real pleasure to us to share with you in the legitimate pride with which you have referred to the wonderful demonstration of Queensland's natural resources, for which, year by year, for the past fifty-five years, this National Association has afforded an opportunity. For generations past it has been recognised in Great Britain that nothing does more to stimulate progress and efficiency in all branches of agricultural and pastoral industries than the work of associations such as yours; by the prizes offered at annual Exhibitions you provide a most powerful incentive to the raising of standards all round, and the high standards are the only ones worth aspiring to or being satisfied with."

Unparalleled Possibilities.

"Fortunately, the climate and the soil of Queensland," added His Excellency, "offer a range of possibilities which it would be difficult to find a parallel for in any part of the world, and the numbers and quality of the exhibits are eloquent testimony of the capacity and determination of Queenslanders to develop their splendid birthright.

"The association," continued His Excellency, "was doing great work in another direction. It afforded a legitimate opportunity to the men and women who lived and worked on the land to enjoy a well-earned holiday in the capital of Queensland, and to their fellow-countrymen who dwelt in the city it furnished an opportunity of realising the magnitude and importance of the State's agricultural and pastoral resources. Most important of all, perhaps, the Exhibition brought home to every one a real community of interests which united the well-being and prosperity of town and country. He congratulated them most warmly on the continued and uninterrupted expansion of their successes. It had not been achieved without much hard work, a great deal of it performed gladly as a national service without any pecuniary remuneration. The value of that service to the State could not be exaggerated, and he thought it could fairly be said that the support they received from exhibitors showed how greatly it was appreciated. He would like to congratulate them, too, on the combination of courage, intelligence, industry, and enterprise which could alone have brought the exhibits to the high state of perfection which they saw to-day. To one and all he would like to offer sincerest wishes for their continued happiness and success."

OTHER ADDRESSES

Economic Unity.

In the course of a notable address at the official luncheon, His Excellency the Governor-General, Lord Stonehaven, said: "We all share in the one great birthright over the rest of the world, and that is Imperial citizenship. Because we are sharers of that birthright I look upon myself as a fellow-countryman of yours, just as you have the right to consider yourselves fellow-countrymen of mine, if I should meet you in Edinburgh.

PLATE 58.—AN OFFICIAL GROUP AT THE OPENING.

Included in the gathering are (front row) their Excellencies the Governor-General Lord and Lady Stonehaven; their Excellencies the State Governor, Sir John and Lady Goodwin; the Premier, Hon. A. E. Moore and Mrs. Moore; the Chief Justice, Sir James and Lady Blair; the Lord Mayor of Brisbane, Mr. W. A. Jolly and Mrs. Jolly; the Leader of the Opposition, Hon. W. Forgan Smith and Mrs. Forgan Smith; the President of the Royal National Exhibition, Mr. Ernest Baynes and Mrs. Baynes; the Minister for Agriculture and Stock, Hon. Harry F. Walker; the Minister for Roads and Railways, the Hon Godfrey Morgan; the Minister for Mines, Hon. E. A. Atherton; and the Treasurer, Hon W. H. Barnes and Mrs. Barnes.

"That brings me to a consideration of the need for closer economic unity between the home country and the distant parts of the Empire. In Great Britain we are striving, as you are here, for an ideal high standard of living. To maintain that high standard of living, however, it is necessary that you should live in circumstances which enable you to earn the wherewithal to pay for it. The whole Empire must in the future be regarded as one great Commonwealth. If we considered ourselves as isolated units, and not as members of a great kinship of brotherhoods of people scattered over the world, inevitably the standard of living would depend on the resources of the particular country in which we happen to live. That, however, is too narrow a viewpoint. We have to regard the matter from the standpoint of our over-riding Imperial nationality. The British Empire produces within its boundaries everything in the way of food and raw material that mankind could desire. It is so extensive that it has every variety of climate and every type of production. We of the British Empire have a past made glorious by efforts and achievements such as no other nation can show. It is by a closer union of commercial interests between the United Kingdom and the various parts of the Empire that we can look forward with absolute confidence, not only to the maintenance of the standard of living we have had in the past, but to the raising of that standard. The great need is to stimulate production from every part of the Empire, and to secure the efficient marketing of those products in the Homeland."

Increased Efficiency—Empire Marketing.

"This Exhibition," continued His Excellency, "has provided a wonderful demonstration of the important part that Queensland and Australia can play in that endeavour. The activities of your society provide a marvellous means of educating the people as to the wonderful resources of this State. A visitor to the Show must be very stupid who does not realise that it presents opportunities for learning many things which will be useful to him throughout his life. The fine exhibit in the meat pavilion, and the magnificent show of dairy products in the butter pavilion, are in themselves highly educative. In the butter pavilion is a chart which shows very plainly the wonderful advance that has been made in the dairying industry of this State. It is shown that between 1910 and 1929 the dairy cattle increased in numbers from 365,000 to 740,000, and the output of butter increased from 31,500,000 lb. to 70,750,000 lb., while there has been a proportionate increase in the cheese produced. That shows clearly that by means of increased efficiency in industry we are now obtaining a higher yield per head from our dairy cattle. That is an important indication of progress. I realise that in Australia you cannot consume the total amount of your farm produce, and it is necessary to find markets abroad. In England, on the other hand, we are in a position of having to import a large proportion of the foodstuffs we require. What we want in England is more foodstuffs from inside the Empire, displacing that which is coming in from other countries. I would strongly urge you to develop your meat industry in Queensland, with a view to supplying the needs of Great Britain. Unfortunately, statistics show that the exports of frozen beef and mutton from Australia represent a remarkable shrinkage as compared with the imports from foreign countries.

Community of Interests.

"That brings us to the community of interest on the part of all sections of the British Empire, and the necessity for uniting together to overcome the competition of foreign countries on the home market. I think that your Show does an invaluable work in bringing home to all and sundry the fact that it is only by using our utmost intelligence and by honest hard work that we can attain to the highest efficiency. It is this efficiency in industry and ingenuity in displaying your goods that is required to place your products on the tables of the people in the homeland, who would prefer to be your customers than those of foreigners. The question is how this desideratum is to be attained. Whether it be in peace or war, teamwork is essential to success. It is necessary that we should be as thoroughly organised commercially as politically. If we can transfer to the economic sphere the same activity that we are devoting to the political sphere, it is certain that economic conditions throughout the Empire will be greatly improved. If that teamwork is achieved, you will find that the difficulties with which we are manifestly surrounded at present—in common with all parts of the world—will speedily be overcome.

"Your president has referred to my impending departure. With the improved means of communication existing at the present day, the various parts of the Empire have been brought closely in touch with Great Britain, and I look forward to having an opportunity on some future occasion of visiting your Show. I hope that I will then be one of the crowd of spectators to join in a welcome extended to the King's representative, such as I received to-day.

PLATE 59.—A GRANDSTAND VIEW OF THE STOCK PARADE.

No Limit to Expansion.

"As to Queensland, this is a country in which there is no limit to the expansion of which you are capable, and the prosperity you may enjoy. There is no part of the world which is more favoured by Nature, but in order that you may maintain the high standard of living which now exists it is necessary that every man and woman must give of their best. As far as Great Britain is concerned, we welcome your exports of butter and meat, and we will collaborate and co-operate with you as far as we possibly can in marketing your products in the old country. By doing that we will be contributing to the happiness of your people, who, though separated from us by 12,000 miles of sea, are imbued with the same ideals of loyalty as ourselves—loyalty which flourishes as strongly here as in any other part of the British Dominions." (Cheers.)

Speech by the State Governor.

The Vice-president (Mr. P. J. Symes), in proposing the health of His Excellency the Governor, said that both Sir John and Lady Goodwin, by their visits to all parts of Queensland, had contributed much to the happiness of the people. Sir John was essentially an optimist, and in his journeyings throughout the State he radiated a confidence in its future prosperity.

Sir John Goodwin, in reply, said he had spoken many times before of the high value he placed on the work of the Royal National Agricultural Association. One of the most valuable spheres to which it extended its work was that of education. It did one good to see young people watching the judging and judging themselves. It also was a pleasure to see the number of people who came to the Show discussing the exhibits, and thereby gaining a large amount of knowledge which would help to improve methods in the future. There were over 41,000 people at the Exhibition on the previous day, and he had met and conversed with many, and had gathered that they were all learning. It was of immense importance that the people of the cities should know how those of the country earned their living and how they were producing the primary products which were on view at the Exhibition. Were it not for the Show many people would inevitably be in ignorance of conditions which governed the North and West of the State.

One very important lesson was to be learned from the Show—Queensland must be up-to-date and follow modern methods. There could be no standing still. We must always move forward, improving our methods and learning fresh scientific facts. Queensland had to produce the very best, and the very best which the State had produced to date was to be seen at the Show. He was particularly impressed with the dairy cattle, but even that high standard must be not only maintained but raised, so that the country would be able to compete in the markets of the world. He did not think a better meat exhibit could be shown in the world than was on exhibition in Brisbane this year. Individuals must all give of their very best ability in their jobs in order to help the country to place on the world's markets the goods that it was so favoured in being able to produce.

A Vice-Regal Optimist.

"It has been said I am an optimist," continued His Excellency. "Of course I am an optimist. I talk a lot to the children of this State, and learn a good deal from them. A child a little time ago was asked the difference between an optimist and a pessimist. He answered that an optimist was a man who attended to your eyes, and a pessimist one who looked after your feet. (Laughter.) I think that answer is not altogether wrong. An optimist is a man who learns lessons from past experiences and who realises difficulties of the present, and also those which may continue or arise in the future. With a clear vision he looks forward to the future, and does not get depressed; he envisages how his difficulties may be overcome, and he will come out on top in the end. The pessimist's vision does not rise higher than his feet, and he gets depressed at any difficulty and fails to look forward to its surmounting.

"There are two chief reasons why I am an optimist," explained Sir John. "The experience of Queensland which I have had during the past three and a-half years has convinced me that this State can produce the very best; and I believe that Queensland will face all difficulties and emerge triumphant over them all." His Excellency went on to say that a former Governor of an Australian State had told him before he left England that he should avoid two terms—"immense potentialities" and "recuperative capacity." But he could not help observing that Queensland had a power for recovery which was not equalled by any other country in the world.

PLATE 60. UNDER THE CRITICAL SCRUTINY OF THE RINGSIDE CROWD.

A portion of the Grand Stock Parade of Animals representative of many of the most famous families entered in British and Australian Herd Books.

Advantages of the Show.

The Premier of Queensland (Mr. A. E. Moore) proposed the toast of "The Royal National Agricultural Association." He said that Queensland was extraordinarily fortunate in having such an association. He knew of no organisation which was doing work of a greater value to the State and the Commonwealth. One of its many virtues was that it was pointing out the need in Australia for efficiency and for striving after the very best results. It also conferred an opportunity on the individual to exhibit his industry, efficiency, and enterprise in the best possible way. Queensland had one of the greatest opportunities that had been given to a nation—that of becoming a foremost food-producing country—and the Royal National Agricultural Association of Queensland was standing like a fingerpost, indicating to the people that good enough was not good enough, and that the State must produce only the very best. That was illustrated very well in the Exhibition, where all strove to give something a little better. The association was succeeding in doing that, and its success was a big factor in the progress of the country.

The Chairman of the council of the association (Mr. J. Hiron), in his response, said the association appreciated very much the interest which His Excellency the Governor-General (Lord Stonehaven) and Lady Stonehaven and his Excellency the Governor (Sir John Goodwin) and Lady Goodwin took in the Show and in the society's work. No show would be anything if they did not have exhibitors, and to them a large share of the credit was due.

Plate 61.—The Brisbane Show Breeds Optimism.

A cheerful ringside group. Left to right—The Premier, Mr. Moore, and the Rev. Rabbi and Mrs. Levine, Mrs. A. E. Moore, Mrs. Forgan Smith, and the Leader of the Opposition, Mr. Forgan Smith.

PLATE 62.

That the horse is still a factor in successful farming was demonstrated by this parade of Clydesdales at the Brisbane Royal. Notwithstanding the great increase in mechanical transport, the horse is still the more economical power for short hauling and for working the smaller arable areas.

THE COURT OF AGRICULTURE.

REPRESENTATION AND REVIEW OF DEPARTMENTAL ACTIVITIES.

THIS year's display of the Department of Agriculture and Stock was a departure from the models of former years, and a number of new features were introduced, both in the general design and in the case of individual exhibits.

In the lay-out of the Court the key industries of Queensland, wool and sugar, occupied the central position on two wall displays 150 feet in length. In each instance the superstructure of the central trophies took the form of a massive arch supported by pillars of wool and sugar-cane, flanked in the case of the wool with a comprehensive array of cereals. The sugar trophy was supported by dairying and tobacco displays, with two smaller panels illustrating the swine and poultry industries.

Occupying most of the floor space of the Court was a field of cotton ready for harvesting, with a small vine-clad settler's hut in the background. By this arrangement public attention was focussed on cotton, a crop with improving prospects both on the cultural and manufacturing sides.

Entomology and plant pathology were picturesquely panelled. The destructive agencies of plant life, also the highly scientific and technical work necessary to cope with them, were graphically illustrated.

The complexity of modern country life, the attainment of high standards of husbandry, and every phase of rural economics in one phase or another were illustrated effectively in the Departmental Court.

The public was informed by gripping epigram of the vast value of our primary production and the importance of its place in the economy of the Commonwealth.

QUEENSLAND'S WEALTH IN WOOL.

The design of this year's wool exhibit varied considerably from that of previous shows, and was placed in close proximity to the wheat exhibit, the association suggesting that sheep and wheat offer the best possible combination for districts where cultivation is practicable.

The exhibit was arranged with the express purpose of illustrating the activities of the Departmental Sheep and Wool Branch under the control of the Senior Instructor in Sheep and Wool, Mr. James Carew, assisted by Mr. J. L. Hodge. An important part of this work is purely instructional. Sheep farms and holdings in different parts of the State are visited regularly for this purpose, and modern methods of animal husbandry successfully inculcated.

Under the farmers' wool scheme, designed by Mr. W. G. Brown, formerly Instructor in Sheep and Wool, a greater quantity of wool was received for classification this year than previously, which indicates that the small grower appreciates this excellent Departmental service. Out of 108 consignments received, seventy classes were made, each class being distinct. Thus the buyers may know the class of wool they are purchasing, and in consequence the Departmental brand is becoming increasingly popular. This season 108,380 lb. of greasy wool were sold, averaging just under 9d. per lb., a price that emphasises the marked decline in values of recent years.

In order to assist growers in determining the value of their pasture samples of grasses are secured regularly for analysis, and the information so derived is made readily available. The system and its results were well illustrated in the Departmental Court.

Scoured wool was a very attractive feature of the wool display, which consisted throughout of first quality counts and classes.

Manufactured materials, the product of Queensland woollen mills, illustrated the greater possibilities of this side of the industry, as well as the progress in spinning and weaving already made in the State.

The whole range of activity in the pastoral industry from the pasture to either the loom or the freezer was set out very effectively.

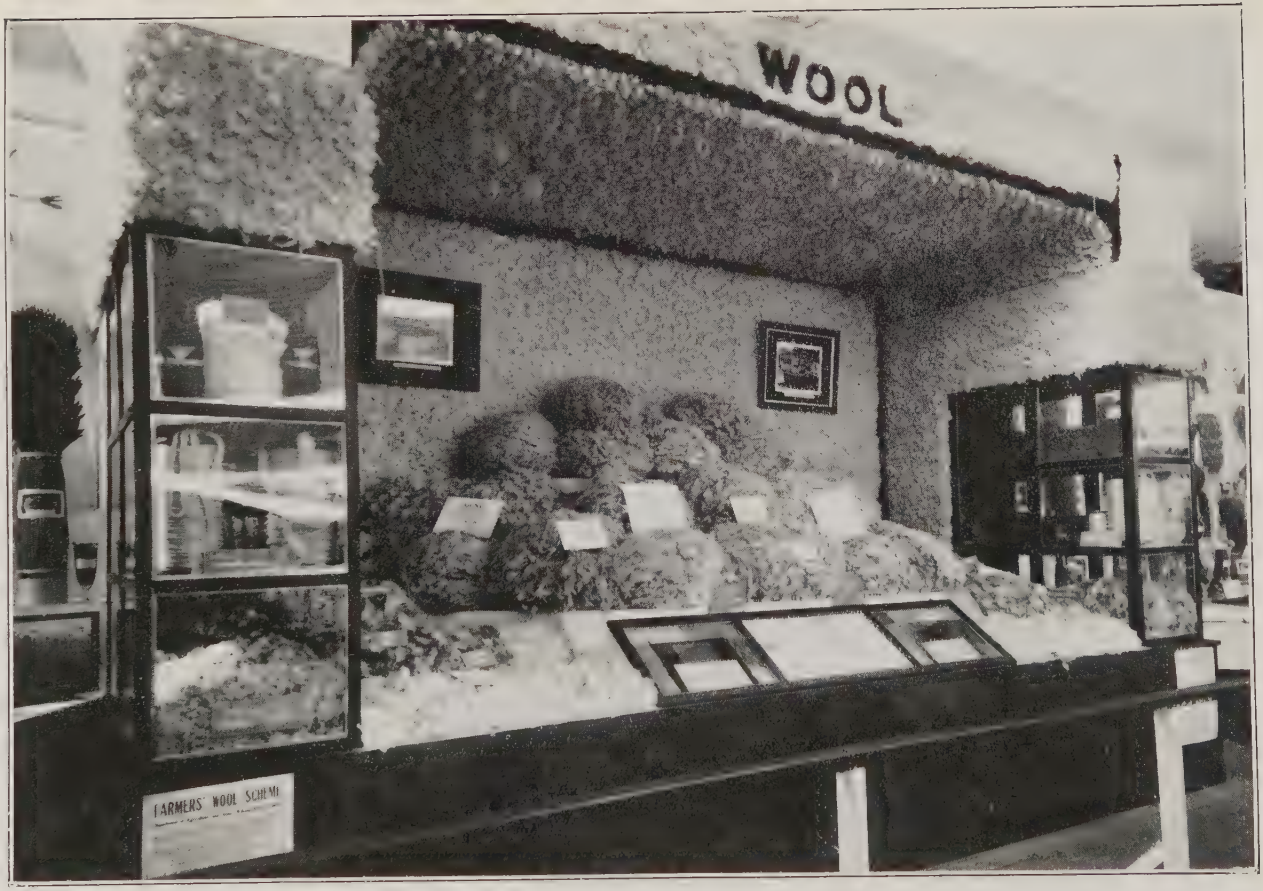


PLATE 63.—WOOL EXHIBIT, DEPARTMENTAL COURT.

The wealth of Queensland's pastures and high standards of husbandry were fitly represented in a wonderful Wool Exhibit in the Departmental Court Side panels contained samples of textile fabrics from Queensland Woollen Mills. To-day, this State runs over 20,000,000 sheep, and our annual wool exports are worth round about £10,000,000.

PLATE 64.

A POPULAR VERDICT WAS GIVEN ON THE EVIDENCE—AND THE APPEAL. FLEECES FROM QUEENSLAND FLOCKS.
This fine display of wool was arranged by Mr. W G. Brown, Sheep and Wool Expert, formerly of the Department of Agriculture and Stock, for the Royal National Association.

QUEENSLAND'S GREAT SUGAR INDUSTRY.

DISPLAY BY THE BUREAU OF SUGAR EXPERIMENT STATIONS.

The varieties of cane exhibited by the Bureau of Sugar Experiment Stations included varieties from Hawaii, Java, India, Mauritius, and Queensland. The Queensland canes included new varieties raised from seed at the Sugar Experiment Station at South Johnstone. Up to the present many thousands of these seedlings have been raised, but many of them, of course, are weeded out in the process of selection. Commercial trials of the best of them are now being undertaken, also experiments as to their disease-resisting qualities. Before any cane varieties are allowed to leave the Experiment Stations they have to pass chemical and commercial trials through plant, first ratoon, and second ratoon crops. Each variety is tested not less than four times in the course of the sugar season, so that records are obtained giving farmers and millowners information as to whether canes are early or late, and as to whether their sugar contents are sufficiently high to warrant their adoption. This is combined with agricultural trials in the field, so that it may be determined whether such varieties are good croppers. They are further keenly watched for evidence of disease, and no affected canes are allowed to go into distribution. Information of this kind could only otherwise be secured by growers and millers at the cost of much time and money, and the rejection of many useless canes by the mills, which would be accompanied by severe loss to the growers.

Full descriptions of the varieties exhibited appeared on the cards attached to the canes, which also give commercial cane sugar content. Many of these canes are at present undergoing chemical and field tests, while others have passed the probationary period and have been distributed to canegrowers. These varieties, however, comprise a very small part of the number of new and tested canes that have been distributed from the Experiment Stations during the past twenty years.

Sugar-cane Propagation.

The Sugar Experiment Station at South Johnstone, near Innisfail, has, during the past seven years, been engaged in raising cane from the seed found in the arrows. This requires the utmost care, as the seed is very minute and has to be most carefully handled. Specially prepared boxes of soil are used, which have previously been sterilised. The cane arrows, when mature, are gently broken off, spread over the soil, watered, and then covered with glass plates. When germination takes place, a large number of minute shoots like grass appear. When these have made further growth they are carefully pricked out into pots or boxes, and are ultimately removed to the field. Several of them which were taken from Badila cane have Badila characteristics, and it is trusted that a cane equal to the Badila will be discovered.

Work of the Sugar Bureau.

The work of this Bureau is divided into four divisions—viz., Soils and Agriculture, Pathology, Entomology, and Sugar-mill Technology—each with a research officer in charge, and a staff of trained assistants. The headquarters of the Bureau is in the Department of Agriculture Building in Brisbane. The recently completed chemistry and pathology laboratories are located here, and these are well equipped and up-to-date. The research activities of the two former divisions are carried out in these laboratories.

Three experiment stations are located in the important sugar areas of the State—one each at South Johnstone, Mackay, and Bundaberg. These are maintained for the purpose of carrying out field experiments on soil treatment, fertilisation, and varietal trials. The stations are also provided with chemical laboratories, equipped for routine, soil, water, and cane analyses.

The Soils and Agricultural Division also controls the extension service. Field officers are suitably located throughout the cane areas, and they keep in close touch with the growers, to advise on any matters pertaining to cultural treatments and pest and disease control. Further, these officers lay out and supervise cultural and varietal trials on chosen farms, so that the exact requirements of individual soil types and climatic conditions may be determined. In the course of the past season nearly seventy such trials were set out.

The Pathology Division has, at present, officers both in the field and in the laboratory, studying the characteristics of and possible control measures for the major cane diseases.

Entomologists are maintained at selected locations so as to be able to deal most effectively with the study and experimental control work of the most important cane pests. The main laboratory is situated at Meringa (near Cairns), so as to serve the far

Plate 65.—A White Man's Industry in a White Man's Land.

The Cane Alcove in the Court of the Department of Agriculture was a very attractive representation of an industry carried on successfully by White Australian Workers in field and factory, and which is worth well over £10,000,000 a year to the Commonwealth. Sugar growing is this State's leading agricultural enterprise, and in this bay of the Court the farm and laboratory activities of the Bureau of Sugar Experiment Stations were strongly illustrated.

Northern areas, where pest damage is most serious. An entomologist is also located at each of the experiment stations of Mackay and Bundaberg.

The division of Sugar-mill Technology was recently initiated, and is now in the process of organisation. With a well-equipped laboratory at Mackay, the technologist and his staff will investigate the problems pertaining to the various phases of sugar extraction and manufacture.

In all, there are twenty-three officers on the Bureau staff, and the organisation covers the several phases of cane production and manufacture in a manner quite unique amongst the primary industries of Australia. The funds for the maintenance of the Bureau are contributed equally by the industry and the Government.

Economic Value of Cane Cultivation—Its National Significance.

The work of the Sugar Experiment Stations, in relation to the promotion of the agricultural welfare of Queensland in connection with the sugar industry, cannot be over-estimated. When it is considered that this industry is the greatest agricultural one in Queensland, and will produce over 500,000 tons of sugar this year, estimated to be of the value of about £10,000,000, it can be seen how highly necessary it is that it should be assisted and encouraged in every possible way. Apart from its economic value, however, it has a deep national significance, and has already played a very large part in peopling the North.

Rainfall.

The Queensland rainfall, fortunately, is highest during the summer period, at which time the cane plant makes its maximum of growth. The following are average rainfalls in the principal sugar-growing districts:—Cairns, 92.65; Johnstone River, 160.88; Herbert River, 84.91; Mackay, 66.67; Bundaberg, 44.40. Cane grows best when the relative humidity of the atmosphere is high, and this is the case during the wet season in Northern Queensland.

Production and Prospects.

Queensland's sugar production in 1867 was 338 tons, and in 1928 reached 520,000 tons, the record crop to date.

The yield of cane and sugar per acre is improving, due to better methods of cultivation and growth of superior canes. The mills have also largely increased their efficiency, and over £2,000,000 have been spent during the past five years in improving existing mills, while, in addition, the Queensland Government have the most up-to-date sugar plant in Australia in the Tully River district.

Queensland is by far the largest sugar producer in the Commonwealth, manufacturing about 96 per cent. of the total output. The sugar-fields stretch along the north-eastern coast of Australia (with some intervals of poor land with deficient rainfall), from the border of New South Wales to Mossman in the Cape York Peninsula, The total acreage under cane is now about 290,000. It is, therefore, the largest agricultural industry in Queensland.

To deal with the cane supplied from this acreage there are thirty-five sugar-mills in operation. Each mill has a system of 2-feet tramways radiating to the surrounding farms for the transport of cane to the mill, while all the mills are connected by rail to the nearest seaport, the manufactured raw sugar being shipped away to the refineries at Bundaberg, Brisbane, Sydney, Melbourne, Adelaide, and Perth.

Progress in the North.

One of the most marked features of the sugar industry in recent years has been the great progress made by the sugar districts north of Townsville. In 1910 the sugar-mills beyond Townsville produced 57,135 tons of sugar, while in 1928 the production in this area reached 255,188 tons from ten mills, while the twenty-five mills south of Townsville produced only 265,432 tons. This has been due to the opening up of fine sugar lands in the rich rain-forests of Babinda, South Johnstone, and Tully, and the development of the older lands at Cairns and Ingham, by providing more capacity at the existing sugar-mills.

The opinion held by medical men is that the white man can lead a healthy life and rear a vigorous family in tropical Queensland.

The Cane Alcove in the Court of Agriculture contained information and illustrations relating to the whole sugar industry from the first cultural operation to the last refining process.

DAIRYING.

The Dairy Exhibit was a comprehensive one with a strikingly original arrangement. Milks, cream, granulated butter, and butter were exhibited; also cheese in its various stages of manufacture. By-products, such as casein, dessicated milk, milk powder, were also strongly in evidence. Herd testing in all its detail and bacteriology as it applies to dairying was given prominence.

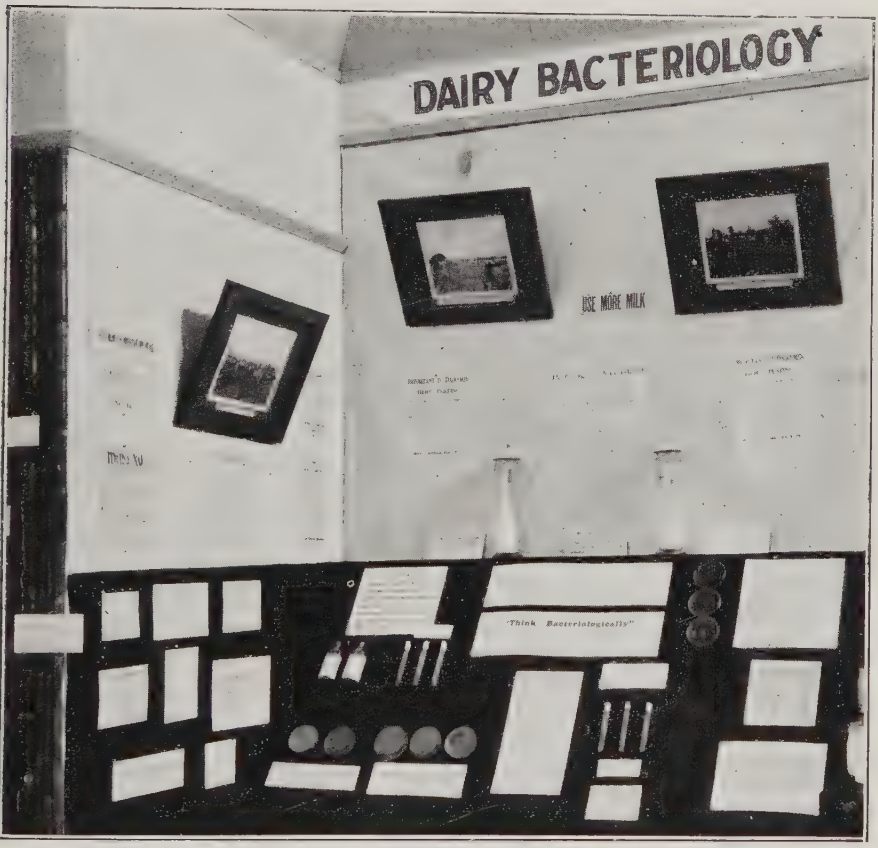


Plate 66.—Milk and Microbes.

That there should be no synonymity in this term was demonstrated most effectively in this corner of the Court. The necessity of scrupulous cleanliness in the milking-shed and dairy was impressively illustrated.

The central idea of the display was based on the food value of milk. An imitation bottle, 6 feet high, set out with an appropriate background, formed the centre of the trophy, around which pasteurised milk, in bottles of varying sizes, were placed in such a way as to emphasise strongly this method of milk delivery.

A number of slogans urging the value of milk and its products completed a very fine display that won popular commendation.

PLATE 67.—MILK FOR THE MULTITUDE.

Dairying is a great and rapidly expanding industry in Queensland, one fourth of the total Butter output of the Commonwealth and almost half of the Cheese out-turn are produced from Queensland's pastures. Its annual value is approximately £7,000,000.

POULTRY RAISING.

The exhibit of the Poultry Branch, as in previous years, was of outstanding interest. A feature of the display was the variety of poultry farm requisites, and in designing these consideration was given to simple and cheap methods of construction and maintenance of efficiency. In keeping with the present over-production of eggs in comparison to local consumption the trap nest was shown, illustrating that by its use the poultry farmer is able to produce eggs at a much lower cost. The demands of the industry at present are that eggs must be produced cheaper, and by the installation

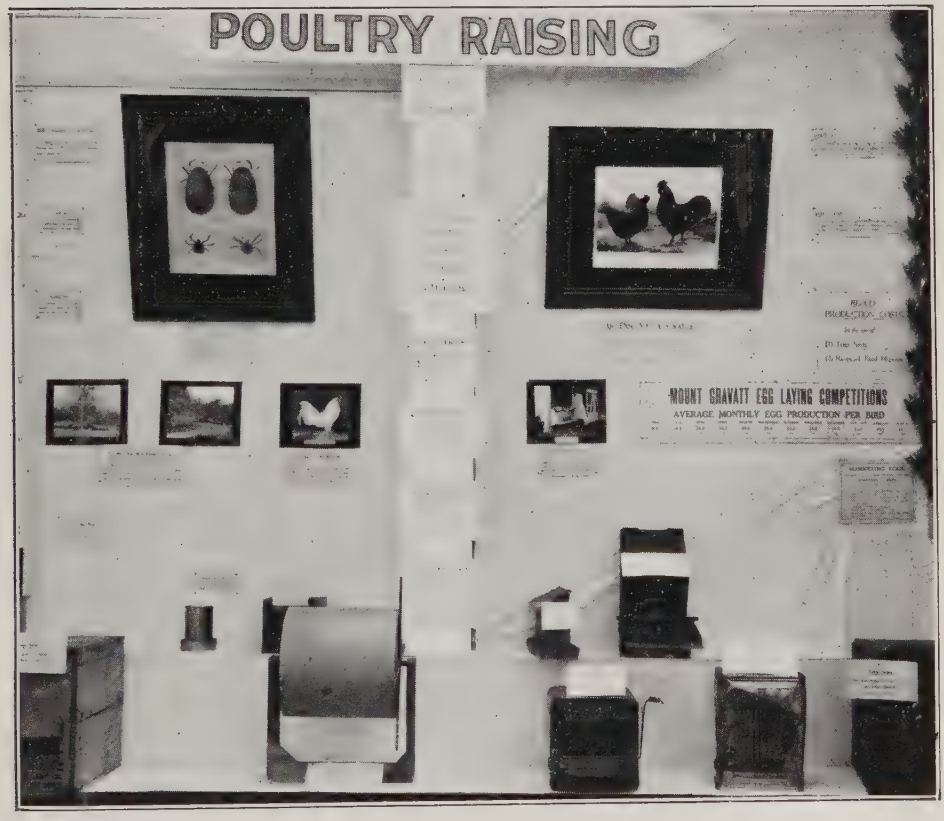


Plate 68.—The Poultry Panel in the Agricultural Court.

This display illustrated the educational work of Departmental officers in a rapidly expanding and valuable Queensland industry returning nearly £1,000,000 annually to the State.

of the trap nest the poultry farmer is able to locate non-layers, and these can be culled, thereby increasing the average egg yield in relation to the quantity of food consumed. The trap nest is also an aid to flock improvement, for by its use the best layers can be selected for breeding purposes.

Numerous practical examples of breeding, feeding, housing, and other phases of poultry raising were displayed. These were really pointers to success in poultry keeping.

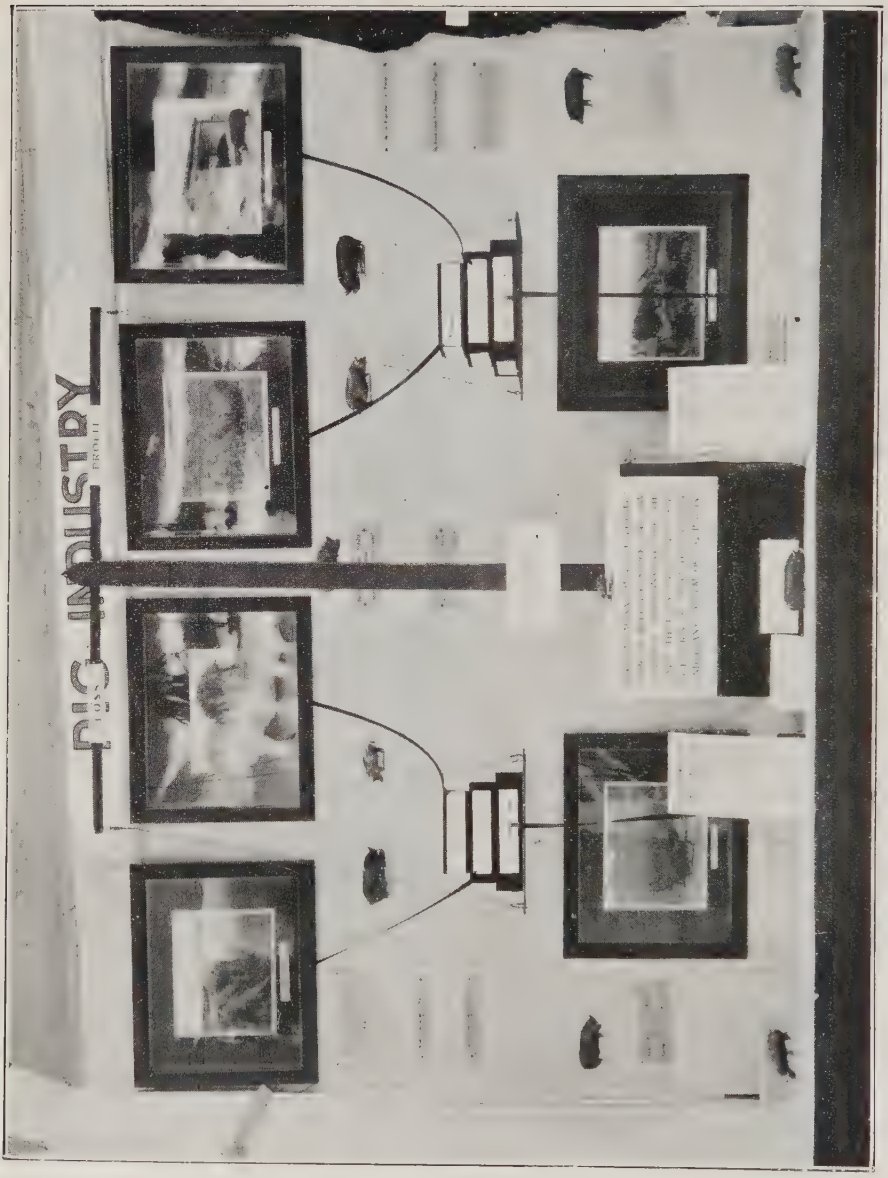


PLATE 69.—A BALANCED INDUSTRY. PIG EXHIBIT, DEPARTMENTAL COURT.

Pig raising in Queensland is rising rapidly in importance as a staple industry. Throughout the year an active educational campaign is carried on by the Department of Agriculture and Stock, and this panel illustrated the nature and value of that work.

PIG RAISING.

The pig-raising activities of the Department were strongly illustrated by trophy and illuminating legend.

A gigantic set of scales, balancing profits and losses and the factors governing both, made up the central feature; thus good breeding, feeding, careful management, suitable environment, and judicious control were weighed against neglect, improper breeding, faulty feeding, and unhealthy surroundings.

At the Pig Section buildings, the display of a miniature model farm piggery was a special feature. This had been prepared with the object of providing fresh ideas for the practical layout of accommodation for the pigs. Pig raising is essentially a farm foods feeding proposition, hence the production and utilisation on the farm of the necessary food supplies must be the principal aim of the farmer. This necessitates the provision of cultivation paddocks, grazing areas, and suitable and sufficient paddock accommodation to enable the pigs to be kept in the open air as much as is possible in preference to being continuously housed.

This model of a farm piggery provided not only for cropping areas and for succulent pasture, but also for a satisfactory type of shelter-shed, portable or otherwise, such as is adapted for use in the open-air system of pig raising. Provision was also made for concrete feeding floors and troughs, oiling posts, movable hurdles, netting fences, and drafting yards. The fences, gates, and hurdles were of a type suggested as suitable for the pig farm.

Various cuts of bacon in normal and abnormal condition were displayed with the object of stressing the loss associated with the improper handling of pigs in the fattening and marketing stages. The industry suffers appreciable losses each year through the supply of pigs in an overfat condition and through bruising and damage of carcases in transit.

In the Pig Section were representative animals of the following breeds:—Berkshire, Middle Yorkshire, Tamworth, Poland-China, Gloucester Old Spot, Duroc-Jersey, Large Black, Chester White, pork and bacon pigs. There were also exhibits in the litter weight classes and a display of pigs from the Pig Breeding Experiments at the Gatton College. The pigs were housed under modern conditions.

CEREAL CROPS.

It was a happy idea having the Sheep and Wool, Dairying, Pig Raising, and the Poultry exhibits in proximity to those of Wheat, Barley, Oats, and Maize in the Departmental Court. This arrangement served to emphasise the interdependence in quite a number of ways of these several important industries. The function of a Department of Agriculture, however, is to demonstrate how production may be increased, and the quality of individual products not only improved but maintained.

An examination of the work of officers of the Department through the medium of the exhibits showed that they have tackled their problems in the only way that a scientist can approach them—i.e., by getting down to fundamentals. One striking point in this display was the improvement manifest in the type and quality of grain wrought by the individual breeders of wheat and maize. This branch of research calls in the first place for a natural aptitude and love for such work and, secondly, for vision in respect to its accomplishment. Both attributes were abundantly obvious. Interesting information of various kinds was given regarding each individual industry.

Special attention was bestowed on plant breeding, seed selection, and the production of seed for distribution, to the description and treatment of plant diseases, and to the principles of cultivation and to experiments with fertilisers. Particulars are summarised of a series of fertiliser tests with wheat carried out over a term of fifteen years at the Roma State Farm were set out, and it was of interest to note that up to the present the manuring of the crop on this particular farm has not proved an economic proposition. The inference may be drawn that the conservation of soil moisture and approved methods of cultivation exercise a more direct bearing on yield than that of artificial fertilisers.

Similar remarks may be applied to the fertiliser experiments with maize on the red volcanic soils at Kingaroy, as the results of two seasons' work, were clearly shown on charts exhibited. In the 1928-29 series there were 144 plots, these being protected by buffer areas. Seventy-two plots were fertilised, and there were seventy-two unfertilised plot controls. Each fertilisd plot was surrounded with controls.

PLATE 70.—THE STORY OF THE OPEN DOWNS IN SHEAF, GRAIN, AND VALUABLE DERIVATIVES.

PLATE 71—CEREAL DISPLAY, DEPARTMENTAL COURT.

These two panels told an impressive "Cereal Story" of the progress and development of the great grain lands of Queensland. They demonstrated the success of Departmental Wheat and Maize breeders in the evolution and fixation of varieties and types that have quadrupled our grain yield. The examples shown were bred at the Roma State Farm and grown in different parts of the Darling Downs.

There were six mixtures of fertilisers, and each test was replicated twelve times. The results were negative in character, and there was little or no difference between the yields of the fertilised and unfertilised plots, details of which are as follows:—

Total weight of ears from seventy-two control plots (1.44 acres) = 5,937 lb. = 60.37 bushels per acre.

Total weight of ears from seventy-two fertilised plots (1.44 acres) = 5,987 lb. = 60.87 bushels per acre.

In the 1929-30 series there were 132 fertilised and twelve control plots surrounded as before by a buffer area. Eleven mixtures were used, and each was replicated twelve times, the plots being randomised.

These plots were only recently harvested. Final details have not yet been worked out according to the students' method of calculation.

Taking a bare comparison, however, which is not to be regarded as final, this determination shows the approximate yield to be as follows:—

Total weight of ears from twelve control plots = 357½ lb. = 42.5 bushels per acre.

Total weight of ears from 132 fertilised plots = 4.144 lb. = 44.8 bushels per acre.

Highest average yield was obtained from PsK mixture (twelve replications)—viz., 47.3 bushels per acre.

Average yield from controls (twelve unfertilised) = 42.5 bushels per acre.

Cost of fertiliser (PsK mixture), £1 5s. 10d. per acre.

A small exhibit was staged of the Giant Morocco variety of canary seed, which was propagated by the Department for the express purpose of distributing improved seed to growers. The importation of canary seed to the Commonwealth has now ceased. A pool was formed last year to permit of the product being marketed on a co-operative basis, and a strong effort is being made to grow sufficient canary seed on the Darling Downs to meet Commonwealth requirements.

ENTOMOLOGY.

The work of the Division of Entomology and Plant Pathology was again represented by an extensive display dealing with the more important insect pests and diseases affecting Queensland crops.

The exhibit staged by the Entomological Branch of this Division consisted mainly of a series of life-history cases demonstrating by means of coloured drawings and actual specimens the history and habits of the insects causing serious loss in fruit, vegetables, grain, and other crops. There were also cases dealing with stock pests, such as the blow fly and the cattle poisoning saw fly, which was of special interest to the pastoralist.

Of exhibits of more special interest at the present there were specimens of the banana insect pests, including the banana weevil borer, the banana thrips, the spotting bug, and the fruit-eating caterpillar. Citrus pests were dealt with in one large case supplemented by a separate presentation of the spiny orange bug. A number of vegetable pests, including the cabbage moths, bean fly, potato tuber moth, and the corn ear worm of tomatoes, were displayed in an interesting way. Of special interest to most Queenslanders was a case presenting a study of the prickly-pear destroyer, *Cactoblastis cactorum*. The water-colour drawings, which formed a conspicuous feature of this display, were the work of Messrs. I. W. Helmsing, E. Jarvis, and H. Jarvis.

Plant Pathology dealing with the fungus and bacterial diseases of crops was represented by a series of preserved plant specimens, illustrating most of the commoner diseases of fruit, vegetables, and cereals. Jar specimens were supplemented by coloured illustrations of the various maladies. The several diseases of the banana, citrus, pineapples, and tomatoes were dealt with in particular detail. Bunchy top of the banana was well represented by means of a living affected plant and by photographs. Among other well-known diseases displayed were black spot and melanose of citrus, Irish blight of the tomato and potato, water blister of pineapples, and the common wheat smuts.

The Entomological display was arranged by Mr. J. A. Weddell, while the Plant Pathology section was in the hands of Messrs. R. B. Morwood and L. F. Mandelson under the supervision of Mr. J. H. Simmonds, Plant Pathologist.

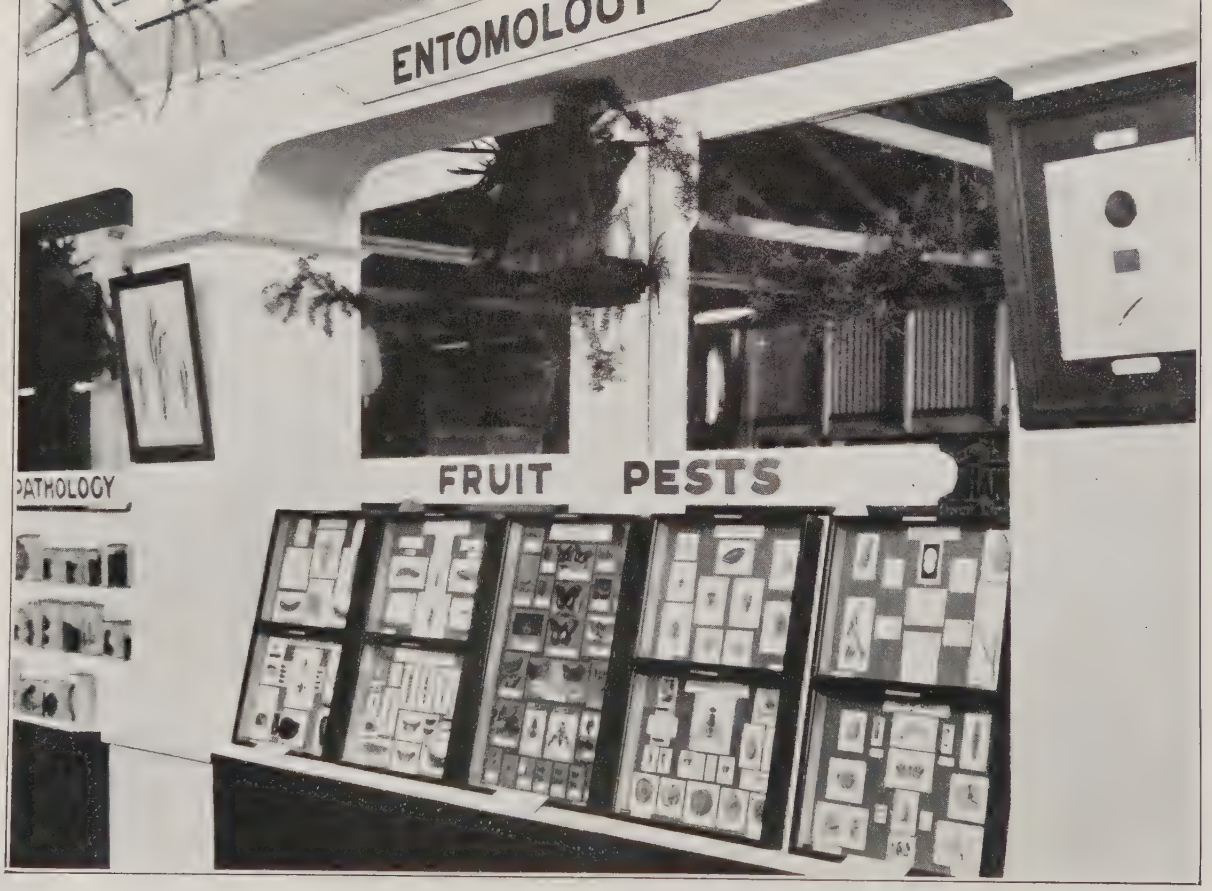


PLATE 72.—FRUIT PESTS EXHIBIT, DEPARTMENTAL COURT.

This and associated annexes in the Departmental Court illustrated the investigations of the Scientists who, in Queensland, work in double harness with the primary producer.

PLATE 73.

A PANEL IN THE DEPARTMENTAL COURT, ILLUSTRATING THE SERVICE OF SCIENCE TO THE FARMER.

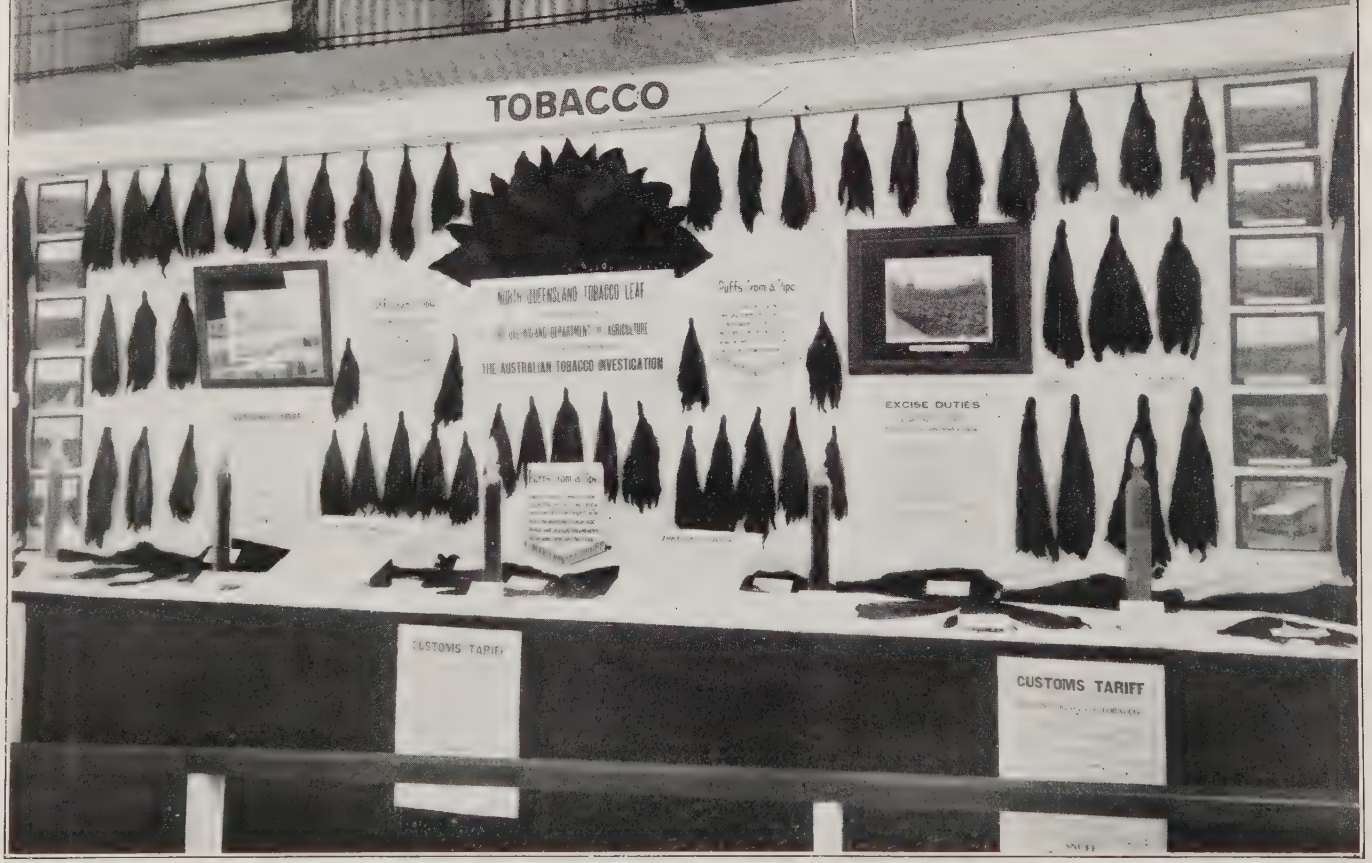


PLATE 74.—QUEENSLAND-GROWN TOBACCO.

This panel in the Departmental Court illustrated the revival in tobacco growing in this State. Leaf produced in North Queensland was recently described in evidence before the Federal Parliamentary Select Committee on Tobacco growing as the best yet produced in the Commonwealth.

TOBACCO.

In view of the increasing interest manifested in Australian tobacco production, the exhibit of tobacco leaf produced in several districts of North Queensland, displayed by the Queensland Department of Agriculture in co-operation with the Australian Tobacco Investigation, attracted a large measure of attention.

Tobacco leaf produced in North Queensland was recently described in evidence given before the Federal Parliamentary Select Committee on Tobacco Growing as the best yet produced in the Commonwealth, while the statement was also made that it was considered possible to obtain from crops grown on certain types of North Queensland soils upwards of 90 per cent. of bright-coloured leaf when flue-cured.

The satisfactory prices, ranging up to 3s. 8d. per lb. according to grade, from the manufacturers for commercial lots of leaf produced in the Townsville, Charters Towers, and Pentland districts, respectively, last year, together with the indication from the purchasers that further lots of similar and better quality would be readily purchased, suggest, especially in view of the increased duty on imported leaf now operating, that tobacco leaf production on suitable soils in North Queensland will prove extremely profitable, and in the near future become an industry of great importance.

The exhibit comprised examples of flue-cured bright tobacco leaf produced in the Mareeba, Ingham, Townsville, Pentland, Bowen, and Mackay districts, respectively, and also examples of air-cured leaf of the White Burley variety produced in the Townsville district.

While bright tobacco varieties are grown on light-textured soils of low fertility, to which fertiliser is added in quantity sufficient to secure moderate leaf development and flue-cured, the White Burley variety is grown on rich soil in order to secure large leaf development, and is air or fire cured. The former is appreciated for mild cigarette and pipe tobacco, while the latter is valued for pipe smoking or for blending in pipe and cigarette mixtures.

Grades of leaf of both flue and air cured types were shown with cards denoting their respective uses in manufacture.

Enlarged photographs depicting crops of tobacco, transplanting young plants, harvesting ripe leaf and other features of production, served to enhance the attractiveness of the display, while tables of statistics relating to Australian manufacture, importations and Customs duties indicated the importance of the industry and the extent of its possible development.

COTTON.

The cotton exhibit this year was arrnaged so as to afford a slight idea of how a field of cotton in full maturity appears. In conjunction with this fine central feature, illustrations explaining the methods adopted by the Departmental officers in the breeding work connected with developing varieties of cotton suitable for Queensland conditions were displayed.

Examples of the standards for grades of seed and lint cotton which are used in valuing the growers' crops when they arrive at the ginnery and prior to the sale of the bales of lint were also on view.

A comprehensive range of by-products obtained from the cotton seed was also presented so as to illustrate more fully the economic value of the crop to Australia generally. Fuller information on this and other phases of the cotton industry accompanied the various sections of the exhibit.

PLATE 75.—COTTON WAS KING.

A field of cotton surrounding a new selector's home was the central feature this year in the Court of the Department of Agriculture and Stock. This year Queensland will pick about 10,000 bales, and the industry is as yet in its rudimentary stage. Projected spinneries will provide a home market for Queensland's "white hope."

PLATE 76.—THE VICE-REGAL ESCORT. TROOP OF QUEENSLAND MOUNTED POLICE.

The Queensland Mounted Police is composed of expert horsemen, and is noted for its very high standard of efficiency. The horses were bred at Rewan, the Government Remount Station in Central Queensland.

PLATE 77.

Queensland Police Horses, representatives of the famous "Waler" type, so popular as cavalry charges in Imperial and Dominion Armies.

DAIRY CATTLE AT THE SHOW.

EVERY year adds to the number of entries representing a splendid class of dairy stock, bred by careful breeders, who, from year to year, have added to the great wealth of the State. There is no doubt that the breeders have not only risen to the importance of producing first-class animals, but have focussed their attention on obtaining tip-top sires, a reflex of careful culling. The long term of winter rains, no doubt, robbed many of the stock of their bloom, and this was frequently commented upon by keen observers. There was, however, a remarkable assemblage of high-class dairy stock, and the judges in all the leading classes had a most difficult task. Hundreds of well-known breeders were present from the sister States, and, with well-known Queensland breeders, expressed the view that to witness such an array of high class stock was a show in itself, and, as many said, an eye-opener.

AUSTRALIAN ILLAWARRA SHORTHORNS.

Of all the breeds, the Australian Illawarra Shorthorn is the one that arouses general admiration, and at several periods of the judging the encroachment of the huge and critical crowd became so great that the stewards had to clear the "decks," and give more room to the judges. The Royal Association might, with advantage to the public, who are ever eager to learn results quickly, appoint two judges for the Illawarras and Jerseys—two classes which have gained great popularity in Queensland, both in number and quality. The judge of the Illawarras, Mr. Jos. Wills, of Kangaloon (New South Wales), took the precaution of having his son, who was present, to assist him in determining the awards. He had a huge task, and his opinion, as a well-known breeder, was one of praise for the class presented.

Cows and Heifers.

As in former years, judging of the cow, 5 years old or over, in milk, proved to be a difficult task. The reds predominated. The choice fell on Mr. J. Phillips's Myrtle IV. of Lemon Grove, and this rich red subsequently annexed the championship. Mr. A. Pickel's Jean VI. of Blacklands, also a deep red, came a good second. The section cow judging, 4 years old and under 5 years, proved to be a tedious job, and a stylish red, owned by Mr. A. T. Waters, Fussy V. of Railway View, secured the blue, while a close runner-up was Mr. J. Phillips's Evelyn of Sunny View.

In the younger set of females, however, an even keener contest was staged, and the class for a heifer, 2 years old and under 3 years, in milk, produced a splendid collection of stock. The beast to attract most attention was Mr. Pickel's Stella of Blacklands, a handsome little red, with great possibilities. In the class, heifer, 2 years old and under 3 years old, dry, there was an even contest, finality resting with Messrs. Hickey and Sons' Happy IV. of Springdale.

There was a very large entry of heifers, 18 months old and under 2 years, dry. Mr. Pickel's Foremost III. of Blacklands was well in the running, and this little aristocrat annexed first place, with Grace IV. of Greenfields second. In the heifer calf class the judge seemed to be perplexed as to where to do justice. The younger generation of show cattle often prove to be future champions, and it was evident that Dnalwon Lucky Star had a good chance, and after a searching examination secured the coveted ribbon. There was keen rivalry for second and third positions. Jean VIII. of Blacklands being placed second, with Kitty of Sunnyview third.

Of the aged cows, the champion cow, Mr. J. Phillips's Myrtle IV. of Lemon Grove, was a rich red, with a wonderful constitution, and great breeding. The heritage of this cow is a wonderful asset to the owner, and there was unstinted praise for this beautiful beast when she captured the championship sash. The reserve champion, Mr. A. Pickel's Queen VI. of Blacklands, was a beast of wonderfully true Illawarra type, and the contest was an animated one.

The Bulls.

There is no show in the Commonwealth to-day, and one might safely say in any part of the world, which can stage bulls of the class of Illawarras as were presented at Brisbane this year. The aged bulls, particularly, showed great breeding, with

fully 60 per cent. of them true Illawarra type. There were, however, quite a number presented of a rough and uncouth appearance. The aged bulls were mostly in good condition. The champion, Mr. F. O. Hayter's Daphne's Royal of Hill View, was, in every way, a fine and well-proportioned beast, with a big length and well-formed limbs. His colour denoted the origin of a dash of the Ayrshire, for he showed white spots along his flanks and sides. The reserve champion, Limelight of Gulvallis, was a rich red, and this beast has great possibilities.

The "bloom" of the older bulls was a contrast to the younger generation, and an enormous crowd witnessed the examination of the bull, 4 years old or over. In the class of bull, 3 years old and under 4 years, there was very keen competition, and it was evident that Jellicoe of Headlands had a great chance. This beast had no trouble in getting a first, with Monarch of the Valley second. It was probably in the class bull, 2 years old and under 3 years, that the keenest contest prevailed, and there appeared to be a healthy rivalry between Mr. J. A. Montgomery's Renown of Mountain Home and Messrs. A. J. Caswell's and Franklin's Limelight of Raleigh. The choice fell on Renown of Mountain Home, a well-grown and stylish red.

In the younger classes strict culling was the order, and it was evident that the condition of the young bulls had a determining effect on the judgment.

The Groups.

The showing of groups and the progeny of breeders gave to the public an exhibition of what a dairy herd is like, and during the judging various expressions of opinions were voiced by onlookers, whose verdicts were in sympathy with the judge's decisions. In the breeders' group, Mr. A. Pickels came first and Mr. J. Phillips second. The exhibition groups also showed that Mr. A. Pickels was first and Mr. J. Phillips second. In the progeny stakes Messrs. Hickey and Sons secured first and Mr. A. Pickels second.

THE JERSEYS.

The Jerseys were fully representative of this wonderful breed, and around the ring was a large crowd of interested spectators. The judge was Mr. D. Walters, of Randwick (New South Wales). The decisions generally met with approval. In a brief chat the judge stated that the standard of the Jerseys was not up to that of previous years. It is evident that breeders of this class will require to cull rigidly, and acquire a habit of securing the very best class to breed from. The champion Jersey cow, Messrs. E. Burton and Sons' Oxford Golden Buttercup, was a faultless animal, and the breeders, who are well known throughout the Jersey world, should feel proud of such a bonny beast. This cow also annexed the blue ribbon as a four-year-old, in calf or dry. The reserve champion, Messrs. W. Spresser and Sons' Lucy's Pocket, was an equally attractive animal, and was favourably commented upon. She was placed first in her class, cow, 5 years old or over, in milk. For cow, 3 years old and under 4 years, in milk, a keen contest raged. In this class Messrs. E. Burton and Sons' Oxford Daffodil won a merited first, with Trinity Columbine second. The section heifer, 1 year old and under 2 years, in milk, which was a very heavy class, proved to be one of the most interesting of the day. They were a very pretty lot of animals, and were generally in good condition. Mr. E. Burton's Oxford Aster came first, with a close runner-up in Messrs. Spresser and Sons' Lockit's Pride. In the heifer, 18 months old and under 2 years, there was healthy rivalry, and Oxford Dianthus stood gracefully while the blue ribbon was being placed, and Mr. P. J. O'Shea's Middenbury Golden Lass was rather happy at securing second position.

The Bulls.

The Jersey bulls of the aged class looked well, although some were presented in a rather ungroomed condition. The champion bull, Mr. W. W. Mallet's Trinity Darby (awarded the championship at the 1929 show), was a beast worthy of the best traditions of the breed. The reserve champion, Mr. T. A. Petherick's Trecarne Golden King, is a splendid sire. In the class for bulls, 2 years old and under 3 years, Messrs. Matthew Bros.' Trinity Goodwin had little trouble in securing first place, with Mr. B. J. Jensen's Kelvinside Noble's Chieftain a well-merited second. In the younger classes of bulls there appeared to be a "tail," and culling by the judge was noticed. In the class of bull, 18 months old and under 2 years, Mr. J. Williams's

Trinity Armlet won. For bull, 12 months old and under 18 months, Trecarne Renown was successful, after a very keen contest. The breeders' and sire and progeny groups proved an exhibition of great interest.

THE AYRSHIRES.

As a utility dairy breed it is difficult to find cattle to excel the Ayrshires, and great interest was displayed in this attractive class. The judge, Mr. J. A. Bond, of Dandenong (Victoria), was a very careful adjudicator. Mr. Bond was impressed generally with the Ayrshires presented, and his remarks concerning the champion bull were certainly encouraging. His opinion of the champion cow and bull was that they would command attention in any show ring. The champion Ayrshire cow, 3 years old and under 4 years, in milk, was Messrs. J. H. and R. M. Anderson's Fairview Lady Jean, a rich brown and white beast, with all the attributes of a great milker, and of healthy appearance. The reserve champion was an equally attractive animal, Mr. G. Norgaard's Tina IV. of Longlands. This great animal is possessed of very fine proportions, and bears evidence of great breeding. The same beast gained first place in her class as cow 4 years old or over, in calf 6 months, or dry. In the section of cow, 3 years old and under 4 years, in calf, Messrs. J. H. and R. M. Anderson's Fairview Hannah gained first place, with Stimpsons Ltd. Elersley a well-merited second. The younger females were in small numbers, and were in fair condition, especially cattle from the Downs, which had apparently been running on the wheat fields. The group of three heifers, under 3 years, was an attractive lot, and Mr. Thomas Holmes secured first place, with Messrs. J. H. and R. M. Anderson a good second.

The Bulls.

The aged bulls were a presentable lot, and were mostly in good condition, although possessing a want of bloom. For a bull, 4 years old or over, Messrs. J. H. and R. M. Anderson's Longlands Bonnie Wilk gained first, and at a later period was crowned champion. The reserve champion, Mr. Thomas Holmes's Claredale Bonnie Billy, was an upstanding animal, with a wonderful appearance. In the class of bull, 2 years old and under 3 years, Stimpson's Elersley Grand was placed first. Mr. G. Norgaard's Holm Park Baden came second. The groups of Ayrshires were splendid specimens, and the breeders' group was in every way indicative of the advance which has been made in recent years. The award in this class was won by Messrs. J. H. and R. M. Anderson, with Stimpsons Ltd. second. For the breeders' junior group, Mr. Thomas Holmes came first, with Mr. J. C. Mann second. The exhibitors' group was won by Messrs. J. H. and R. M. Anderson.

THE FRIESIANS.

The Friesians created interest, and this big-boned class of dairy stock appear to be holding their own. The judge, Mr. P. C. Pryce, of Toogoolawah, stated that the breed was in every way sustained, and the class of cattle placed before him were a very creditable lot. In the section, cow, 4 years old or over, in milk, Messrs. Hickey and Sons' College Princess Pontiac won first prize, and in the cow, 3 years old and under 4 years, in milk, the same breeders annexed a first with Stoneybrae Wallflower. In the cow, 4 years old or over, in calf, Messrs. David Young and Sons came first with Inavale Shield. The champion Friesian cow was an upstanding beast, possessing great bone and length. Messrs. Hickey and Sons' College Princess Pontiac gained the coveted champion sash, with Mooloombin Pontiac Girl reserve champion. The younger females were poorly represented.

The Bulls.

It was probably in the Friesian bulls that the chief interest was manifested, and the judge, in placing the champion ribbon on Messrs. David Young and Sons' Colossus of Stathan, was on safe ground, as this animal possessed in a marked degree the characteristics of the breed. The reserve championship went to Mr. W. H. Gram's St. Athan Actuary, a descendant of Pier Rock, a beast known years ago in the show ring. The exhibitors' group was won by Messrs. Hickey and Sons, and the sire and progeny group by Messrs. David Young and Sons.

THE GUERNSEYS.

The Guernseys were poorly represented, and the judge, Mr. G. Elliott, of Lismore (New South Wales), got through his task in quick time. Mr. Elliott's opinion was that the standard of the Guernseys was not up to that of two or three years ago. The cattle on the whole presented rather a rough appearance, and showing points were somewhat neglected. The champion bull, however, would compare favourably with any of his class in New South Wales. This was Mr. W. Cooke's Linwood Favour, a descendant of Shamrock X. of Wollongbar, and the reserve championship was awarded to Mr. A. J. Cranney's Linwood Royal's Laddie. The prize for a bull calf, 6 months old and under 12 months, was won by Mr. W. Cooke's Laureldale Viceroy, and the second position was annexed by Mr. H. T. Blanch's Linwood Lone Star.

Cows and Heifers.

The females in the aged class were poorly represented, and for a cow, 4 years old or over, in milk, the first prize was awarded to Mr. H. T. Blanch's Minnamurra Dairymaid, with Pearl XII. of Boorie second. The champion Guernsey cow was Mr. H. T. Blanch's Minnamurra Dairymaid, and the same exhibitor annexed the reserve championship with his Moongi Pearl's Pet. The younger cattle were in rather poor condition, and excited little comment.

Plate 78.—Keenly Interested in the Ring Events.

The Minister for Agriculture and Stock, Hon. Harry F. Walker, and the State Treasurer, Hon. W. H. Barnes.

PLATE 79.—COY OR CAMERA SHY, A HEREFORD QUEEN.

Mr. P. Reynolds' Hobartville Lady Minerva, First and Champion in the 2 years old and under 3 years, Cow or Heifer Class, paraded by her owner for the admiration of the Governor and Lady Goodwin.

THE MEAT INDUSTRY.

AN EXCELLENT EXHIBIT.

Mr. Ernest Baynes, the President of the Royal National Association, is well qualified to discuss the problems of the meat industry, and he was listened to with attention by the large gathering present at the opening of the Meat Industry Hall at the Brisbane Exhibition. Observing that the exhibit was the fourth of the Show, he said that its object was threefold—to demonstrate how the various parts of the animal could be utilised; to encourage better methods of production; and to establish a better understanding of the economic importance of live stock and of the industries associated with it. He explained that 98 per cent. of the occupied territory of the Commonwealth was grass land, the product of which must find an outlet through live stock, and that of the remaining 2 per cent. devoted to agriculture approximately 90 per cent. was used for the production of grain and fodder, which must either find an outlet through live stock or be dependent on live stock for the economical production of grain. Despite that situation, however, they found that Australia was supplying about 8 per cent. of beef, 11 per cent. of lamb, and practically nothing of Great Britain's pig product requirements. The conclusion to be drawn was that the best solution to the Commonwealth's heavy indebtedness was more live stock—particularly meat-producing animals. The exhibit was valuable, because it analysed the situation thoroughly and offered pointers to prosperity in all branches of primary production. He emphasised the final message quoted in the hall—"There is a great need for every section of the country to increase its supply and improve the quality."

The Premier's Speech.

The Premier (Mr. A. E. Moore), officially opening the hall, said that all the leading features connected with the live stock husbandry had been collected, and artistically and graphically described. The information displayed on every exhibit brought home to the people what the live stock industry and its by-products meant to Australia. Mr. Baynes had told them that 8 per cent. of Australia was grass land—not by any means all of it was good grass land—but all of it could be used by scientific fertilisation, and all of it was possible of enormous expansion. It was gratifying to know that efforts were being made by the Bureau of Science and Industry, in conjunction with the Queensland Government, to extend the knowledge of what artificial fertilisers would do to pastures, and what licks and stock foods meant to the cattle industry and to meat production.

The Export Trade.

The Premier stated that in 1909 Australia supplied 26 per cent. of the lamb exported to England, and in 1929 only 8 per cent. In that time England had doubled its importations from 5,000,000 to 10,000,000 carcases, which showed that there was a big opportunity for lamb breeding in Queensland, especially in the Darling Downs. There was also a big field for veal. The State abattoirs would give opportunities in Queensland for providing and selling meat of the highest quality. Queensland should develop the live stock industry with greater intensity—not only in the interests of the people who grow the stock, but in the interests of Australia. We had a large Empire market and other avenues for our products, and we should develop them.

Doubling the Capacity.

Mr. Moore said that he had been much impressed by a remark by Sir George Julius (Chairman of the Bureau of Science and Industry), that if the people of Australia would only make use of the knowledge they had already gained by science in agriculture and go in for top-dressing and stock feeding rather than looking around for more land they could double the capacity of Australia in two years. He (Mr. Moore) was satisfied from what he had seen that that could be done. The meat industry exhibit was another proof of it. The exhibit was of educational value, not only to the general public but to the producers, because it showed them what they ought to aim at—waste products being converted into valuable exportable surplus. The Royal National Association was to be congratulated in making that wonderful exhibit available; it would have a beneficial effect on the future prosperity of Australia.

An Excellent Exhibit.

Mr. J. B. Cramsie (Meat Industry Board, New South Wales) said the exhibit could not be excelled anywhere. Throughout the hall were lessons written in texts that everybody should read. They learned that the Argentine in 1909 exported 600,000 lambs, and in 1928 3,600,000, whereas Australia in 1909 exported 1,300,000 and in

PLATE 80.

The Premier (Mr. Moore) was keenly interested in the Ring Events.

1928 1,150,000. Australia had gone back, whereas Argentine had come on six times. Last year Canada sent huge quantities of bacon to the markets of Great Britain, and took her share of the £56,000,000 that was paid for pig products by the mother country. Australia exported a miserable £5,000 worth of pig products. There was no reason why Australia should not export a very much larger quantity than that. He hoped that Australia would organise the live stock and meat industry until it got a fair share of the British market. We built that market, and were entitled to a fair share of it.

Mr. Eric Sparkes (President of the Queensland Meat Traders' Association) moved a vote of thanks and appreciation to the Royal National Association, which was supported by Mr. W. C. Watkins and Mr. A. B. Anderson. Mr. J. Hiron (chairman of the council) responded.

BEEF CATTLE AT THE SHOW.

Queensland being the most important cattle-producing State in the Commonwealth, it is not surprising that one of the chief features at the show each year is the fine display of stud cattle, particularly of the beef varieties. On this occasion the exhibits in the beef section were of a particularly interesting character, there being entries from leading breeders in the Southern States. In some cases—particularly in the Hereford classes—the chief prizes were annexed by cattle which had won awards at the Sydney Royal, but no one will grudge the victory to the visitors, who had the enterprise to bring their stock many hundreds of miles to Brisbane. The cattle from the other States in all instances met with keen competition on the part of Queensland-bred cattle, and they won on their merits. In those classes in which breeders from the Southern States were victorious, local breeders were afforded a demonstration which will stimulate them to further improve their herds. Without exception, the judges expressed high commendation of the manner in which the locally-bred cattle had been prepared for the show. No pains had been spared to make them attractive to the judge's eye. The keenness of the competition called for extra care on the part of the judges. The larger number of entries in this class—a record in the history of the show—entailed considerably more work on the part of the officials, but every exhibit was accorded careful scrutiny. The judge commented that only in very exceptional cases was a beast shown which did not merit consideration of its claims to an award.

The general verdict of all the judges was that the stud beef exhibits this year were much superior to what had been seen on any previous occasion, showing that local breeders are adopting every means of improving their herds. It was observed that in regard to the principal breeds—Shorthorns, Herefords, and Aberdeen-Angus—the judges prefaced their comments by the remark: "There is a marked improvement in quality this year." The judging proved that this was the case. In some instances cattle which had won last year failed to score. In many instances younger cattle took the places on the prize list, which had been held for several years by doyens of the show ring. The quality shown in the young stock was such that we may confidently anticipate that next year competition will be still keener and the standard still higher.

His Excellency the Governor (Sir John Goodwin) and also Lady Goodwin showed a lively interest in the judging of the beef breeds, and particularly of the Herefords. His Excellency has a thorough knowledge of the points which the judges take into consideration, and he expressed his admiration of the quality of the cattle presented.

SHORTHORNS.

The popularity of the Shorthorn breed in Queensland was amply demonstrated by the large number of entries in this section, and the closeness of the competition in nearly every class. The judge was Mr. Lomax, whose reputation as a breeder, as well as a judge, stands so high that in every instance his decision was cheerfully accepted. At the close of the day's judging, Mr. Lomax said that there were some cattle of outstanding quality in this section, and the fact that they were bred in Queensland was highly creditable to this State.

Last year the Gindie State Farm exhibits won the championship for Shorthorn bull, with Milton Tribesman III., but he was not shown this year. The championship fell to Mr. J. T. Scrymgeour's roan bull, Netherby Royal Challenge, which is under two years of age. This is a deep-fleshed level youngster, showing good masculinity, and well let down. The judge expressed the opinion that if he had had a little more condition he would have shown to even greater advantage in the show ring.

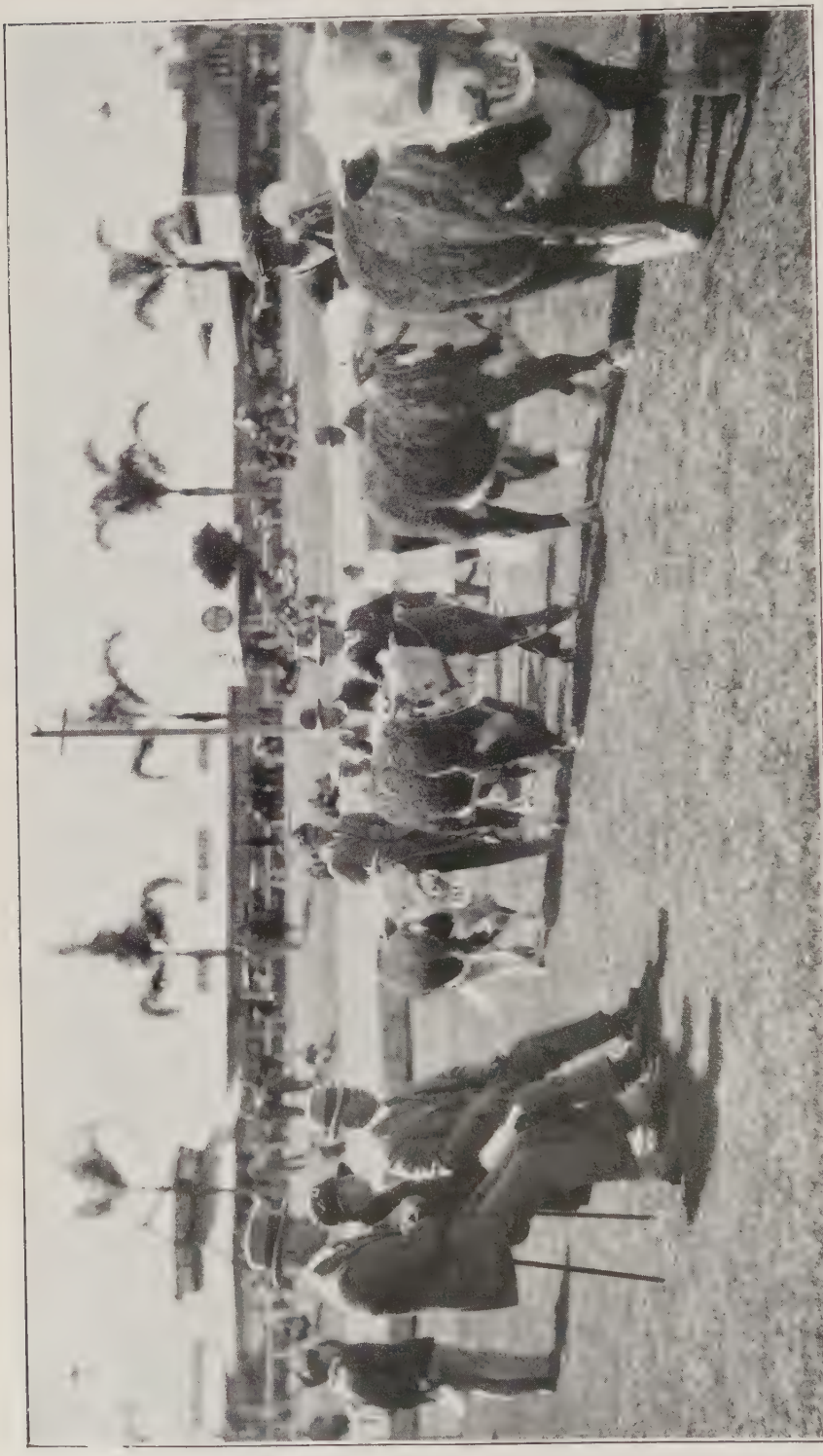


PLATE 81.—HEREFORDS IN THE JUDGING RING.
Sir John and Lady Goodwin, with Mr. Ernest Baynes, were keenly interested in the Stock Parade.

He hesitated for quite a while between this young bull and Milton's Grandmaster, a dark-red three-year old bull belonging to the same owner. His reason for deciding in favour of Netherby Royal Challenge was that he had a little more depth and thickness, notwithstanding the fact that he was giving away a considerable amount in age. The reserve championship thus fell to Milton's Grandmaster.

The championship for the Shorthorn cow provided a very close struggle between a three-year-old heifer, Mr. J. McDougall's Lyndhurst Lily of Gurley II., and a white cow, Mr. J. T. Scrymgeour's Milton's Lovely VI. Ultimately the decision was given in favour of the heifer, which showed much quality and great promise. The judge remarked upon her evenness, and said he expected she would develop into a remarkably fine shower. Milton's Lovely was awarded the reserve championship. This cow was bred by Mr. Anthony Hordern, of New South Wales, many of whose stock have won prizes at the Brisbane shows.

As usual most of the prizes in this section fell to Mr. J. T. Scrymgeour, who owns the fine stud at Netherby, near Warwick.

"Taken all round," remarked the judge, "the cattle showed considerable improvement on past years, and reflect great credit upon the local breeders. Mr. Scrymgeour deserves to be especially complimented upon the condition in which he presented his cattle."

HEREFORDS.

"There has never been a finer exhibition of Herefords in Brisbane," declared Mr. J. A. Beattie, the Nerrandera (N.S.W.) breeder, who officiated as judge. The competition throughout was very keen, and in several instances the judge had great difficulty in making a decision. In the case of the contest for the bull championship, he had to decide between the merits of Mr. P. Reynolds's Hobartville Hercules, a young bull, and the aged bull, Eaton Victor 51st, bred and exhibited by Wilson and McDouall Ltd. Hobartville Hercules had already been awarded the junior championship, and the judge questioned whether that should not preclude him from winning the senior award. The steward, however, pointed out that the conditions of the competition did not provide for that. Indeed, it was shown that five years ago Royal Renown had been awarded both the senior and junior championships. So once more youth won the honours. The champion bull was under two years of age, brimful of quality, and was shown in perfect condition. The judge specially remarked upon its compactness of body, its general high quality, and particularly its thickness and depth of flesh. The reserve champion bull, Eaton Victor 51st, was bred by Wilson and McDouall Ltd., at Calliope Station, Queensland. This bull won the junior championship and reserve championship at the Brisbane Show three years ago.

The championship on the female side also fell to Mr. P. Reynolds, through the agency of Hobartville Lady Minerva 17th, who won the reserve championship at the recent Royal Sydney Show. The runner-up in this instance was Mr. E. R. Reynolds's Ennisview Lady Miss, bred at Oakey (Queensland). The contest was very close.

Mr. Raymond Reynolds, who manages the Hobartville Stud at Richmond (N.S.W.) for his father, Mr. E. P. Reynolds, has shown in Brisbane on previous occasions, but was absent last year, being engaged in officiating as judge elsewhere. He is regarded as one of the best judges of Herefords in the Commonwealth. Queensland appreciates his enterprise in bringing stud stock such a long distance to compete in the show, and his remarkable successes were not begrudged by the competitors. In 1928 he brought four head of Herefords to Brisbane, and secured the senior and junior championships and a reserve championship, as well as five first prizes. On the present occasion, with five head of stock, he captured the championship for bulls and also for cows, and the junior championship for bulls, as well as seven first prizes.

ABERDEEN-ANGUS.

Mr. T. Crawford, the judge of the Aberdeen-Angus section, said that this breed was becoming more popular every year, as was indicated by the increased entries at the Brisbane Show. The exhibits this year were of remarkably high quality, being equal to any seen at provincial shows in the old country. The Aberdeen-Angus breed was particularly suitable for the export trade, and he was, therefore, pleased that the exhibits on this occasion were three times as numerous as last year. The cattle shown fully demonstrated the characteristics of the breed—solid flesh and small bone, which represented economy on the consumer's table. They were a fast-maturing breed, and, unlike some other breeds, did not run to too much fat. Queensland would be moving along sound lines if this breed were introduced more largely on the big stations.

THE AWARDS.

DISTRICT COMPETITIONS—"A" GRADE.

WITH a magnificent and comprehensive display of primary products and manufactures, far excelling those of previous years, the North Coast and Tablelands of New South Wales won the coveted Chelmsford Shield in the contest for "A" grade district exhibits, and retrieved the laurels lost last year. The winning exhibit had a margin of 58½ points over Wide Bay, with the South Coast of Queensland third, 4½ points away.

There is always concern in this contest, and this year there was more discussion and conjecture than ever, which is proof to the National Association that the arranging of such events meets with popularity, not only from the fact of advertising the districts that have arranged the exhibits, but in showing the advancement that is being made in both primary production and manufactures. The maximum points allowed was 1,565, out of which the North Coast and Tablelands District were awarded 1,186, thus securing first place, being 58½ points ahead of Wide Bay and Burnett, with the total of 1,127½ points. The South Coast of Queensland obtained 1,123, which is only 4½ points behind Wide Bay. The Tablelands District of New South Wales thus secured the Chelmsford Shield for a further term. Details:—

	Maximum Points.	North Coast and Tablelands of N.S.W.	South Coast of Queensland.	Wide Bay and Burnett District
DAIRY PRODUCE—				
Butter (1 box, 56 lb.)	90	84½	84	83
Milk and by-products	40	6	4	2
Cheese	60	35	40	30
Eggs	20	16	14	13
Totals	210	141½	142	128
FOODS—				
Hams and bacon	50	46	48	40
Rolled and smoked beef and mutton	20	18	18	20
Small goods and sausages—smoked or preserved	10	9	8	8
Fish, smoked, preserved, or canned	10	7½	8½	7½
Canned meats	25	21	20	20
Lard, tallow, and animal oils	20	18	18	19
All butchers' by-products	10	7	8	6
Honey and by-products thereof	20	17	18	18
Confectionery, factory made	10	8	9	7
Bread, scones, cakes, and biscuits	10	8	9	8
Totals	185	159½	164½	153½
FRUITS, VEGETABLES, AND ROOTS—FRESH AND PRESERVED—				
Fresh fruits	60	48	52	56
Preserved fruits, jams, and jellies	30	28	30	25
Crystallised and dried fruits	20	18	17	17
Preserved and dried vegetables, pickles, sauces	10	9	8	8
Fresh vegetables	20	15	16	18
Table pumpkins, squashes, and marrows	6	5	4	4
Potatoes, English and sweet	40	20	32	22
Roots (including meals)	14	9	12	10
Coconuts, peanuts, and other nuts	10	9	6	7
Totals	210	161	177	167

DISTRICT COMPETITIONS ("A" Grade)—*continued.*

	Maximum Points.	North Coast and Tablelands of N.S.W.	South Coast of Queensland.	Wide Bay and Burnett District
Cereals and By-products—				
Wheat	50	45	20	30
Flour, bran, pollard, macaroni, and other meals derived from wheat	10	7	5	9
Maize	50	43	30	33
Maizena, meals, starch, glucose, and corn-flour	10	4	4	5
Oats, rye, rice, barley, malt, pearl barley, and their meals	30	24	20	23
Totals	150	123	79	100
Manufactures and Trades—				
All woodwork	30	25	30	25
All metal and ironwork	30	20	25	30
Manufactured woollen and cotton fibre	30	24	20	10
Leather and all leather work and tanning	20	15	10	10
All sheet-metal work	10	5	10	7
Artificial manures	10	4	8	6
Brooms and brushes	10	7	9	2
Manufactures, not otherwise enumerated	15	10	13	11
Totals	155	110	125	101
Minerals and Building Materials—				
Gold, silver, copper, and precious stones	25	20	4	20
Coal, iron, other minerals, and salt	30	20	9	20
Stone, bricks, cement, marble, terra-cotta	20	10	15	15
Woods, dressed, undressed, and polished	25	20	20	25
Totals	100	70	48	80
Tropical Products—				
Sugar cane	60	53	57	55
Sugar, raw and refined	20	15	10	19
Rum, other spirits, and by-products	10	..	8	10
Tobacco (cigar and pipe), in leaf	20	16	10	10
Coffee, raw and manufactured, tea, spices, and essences	10	6	6	6
Cotton (raw) and by-products	30	18	20	22
Rubber	10	4	4	..
Oils (vegetable)	10	5	5	5
Totals	170	117	120	127
Wines, &c.—				
Wines	15	12	5	9
Aerated and mineral spa water, vinegar, and [illegible] and cordials	10	7½	6	7
Ales and stout	10	..	..	7
Totals	35	19½	11	23

DISTRICT COMPETITIONS ("A" GRADE)—*continued.*

	Maximum Points.	North Coast and Tablelands of N.S.W.	South Coast of Queensland.	Wide Bay and Burnett District.
HAY, CHAFF, FODDER, &c.—				
Hay (in bale)—Oaten, wheaten, lucerne, and other varieties	30	28	22	18
Hay in sheaf	5	3	4½	3½
Grasses and their seeds	10	9	8½	6
Chaff—Oaten, wheaten, lucerne, and other varieties	50	44	42	36
Ensilage and other prepared cattle fodder	20	13	13	16
Sorghums and millets, in stalk	10	8	8	9
Commercial fibres	15	11	12	11
Pumpkins, green fodder, and fodder roots	12	7	10	7
Broom millet	10	6½	5½	7½
Farm seeds, including canary seed	13	10	9	9
Totals	175	139½	134½	123
WOOL, &c.—				
Scoured wool	10	10	8	8
Greasy wool	70	70	40	50
Mohair	10	8	5	7
Totals	90	88	53	65
ENLARGED PHOTOGRAPHS—				
Of District Scenery and locally bred live stock	5	5	3	3
EFFECTIVE ARRANGEMENT—				
Comprehensiveness of view	20	13	16	16
Arrangement of sectional stands	25	17	21	20
Effective ticketing	10	7	9	4
General finish	25	15	20	17
Totals	80	52	66	57

SUMMARY OF POINTS.

Dairy produce	210	141½	142	128
Foods	185	159½	164½	153½
Fruits, culinary, vegetables, and roots	210	161	177	167
Cereals and by-products	150	123	79	100
Manufactures and trades	155	110	125	101
Minerals and building materials	100	70	48	80
Tropical products	170	117	120	127
Wines, &c.	35	19½	11	23
Hay, chaff, fodder, &c.	175	139½	134½	123
Wool, &c.	90	88	53	65
Enlarged photographs	5	5	3	3
Effective arrangement	80	52	66	57
Totals	1,565	1,186	1,123	1,127½

	Points.
North Coast and Tablelands, New South Wales (First)	1,186
Wide Bay and Burnett (Second)	1,127½
South Coast of Queensland (Third)	1,123

DISTRICT COMPETITIONS—"B" GRADE.

Brisbane Valley, for the fifth consecutive year, prevailed in the competition for "B" grade district exhibits, which are confined to primary production. Mount Larcom was second, and the Northern Darling Downs third. The winning exhibit was an excellent display, and reflected great credit on the organisers.

The excellent presentations made by the districts entered for the "B" grade competitions in the district displays met with no less appreciation than what was manifested in those of the "A" grade. Competitions were confined to localities wherein only primary production is in evidence. The efforts of the Brisbane Valley management and their supporters were successful in securing the first prize, conjoined with which is the valuable trophy presented by the chairman of the National Association Council, with the total of 989½ points out of the maximum of 1,285, which is a most creditable win.

Mount Larcom committee and workers are to be congratulated on securing second place, with the total of 920½ points. More especially is such the case when the long distances covered in conveying the exhibits is taken into consideration. Northern Darling Downs was third with 902 points. Details of the awards are:—

	Maximum points.	Mount Larcom.	Oakey.	Kingaroy.	Brisbane Valley.	Northern Darling Downs.	Nanango.
DAIRY PRODUCE—							
Butter (1 box, 56 lb.) ..	90	81	83½	83½	82	83	83
Cheese	60	23	50	50	20	56	45
Eggs	20	15	13	14	15	15	14
Totals	170	119	146½	147½	117	154	142
FOODS—							
Hams, bacon, rolled and smoked beef and mutton	50	43	47	44	41	42	42
Fish—Smoked	10	8	5	3	3½	3	5½
Lard, tallow, and animal oils ..	20	17	17	18	19	18	15
Honey and by-products thereof	20	14	12	15	17	11	9
Confectionery (home made) ..	10	6	8	8	8	8	7
Bread, scones, cakes, and biscuits (home made) ..	10	8	8	9	7	6	8
Totals	120	96	97	97	95½	88	86½
FRUITS, CULINARY, VEGETABLES, ROOTS, &c. (Fresh and Preserved)—							
Fresh Fruits	60	48	25	40	50	42	20
Preserved fruits, jams, and jellies (home made) ..	30	24	22	22	25	24	22
Crystallised and dried fruits (home made or dried) ..	20	18	18	16	18	14	14
Preserved and dried vegetables, pickles, sauces (home made or dried)	10	8	6	7	8	7	8
Fresh vegetables, all kinds, excluding potatoes)	20	16	17	14	18	15	14
Table pumpkins, squashes, and marrows	6	5	5	5	5	5	6
Potatoes, English and sweet ..	40	23	21	30	35	21	32
Roots and their products, including meals, arrowroot, cassava, ginger	14	10	6	7	12	8	5
Coconuts, peanuts, and other nuts	10	6	7	9	8	7	7
Vegetable seeds	10	6	4	8	7	5	6
Totals	220	162	131	158	186	148	134

DISTRICT COMPETITIONS (" B " GRADE)—*continued.*

	Maximum points.	Mount Larcom.	Oakey.	Kingaroy	Brisbane Valley.	Northern Darling Downs.	Nanango.
CEREALS AND BY-PRODUCTS—							
Wheat	50	29	44	27	33	45	35
Flour, bran, pollard, macaroni, and other meals	10	8	5	5	5	8	5
Maize	50	34	34	36	46	38	40
Maizena, meals, starch, glucose, and cornflour	10	8	5	7	5	5	8
Oats, rye, rice, barley, malt, pearl barley, and their meals	30	21	23	19	25	17	15
Totals	150	100	111	94	114	113	103
WOODS—							
Woods, dressed, undressed, and polished	25	20	18	20	25	20	20
Wattle bark	15	10	12	15	15	10	10
Totals	40	30	30	35	40	30	30
HIDES (1) AND HOME PRESERVES—							
Skins for domestic use	15	13	12	11	11	10	10
TROPICAL PRODUCTS—							
Sugar-cane	60	40	4	9	16	6	7
Coffee, tea, and spices	10	5	..	7	7	5	6
Cotton (raw) and by-products	30	22	20	20	25	22	18
Tobacco (cigar and pipe), in leaf	20	12	14	16	16	12	14
Totals	120	79	39	52	64	45	45
MINERALS—							
Gold, silver, copper, and precious stones	25	17	6	12	16	9	12
Coal, iron, and other minerals, and salt	30	17	10	16	20	14	12
Totals	55	34	16	28	36	23	24
HAY, CHAFF, FODDER, &C.—							
Hay (in bale)—Oaten, wheaten, lucerne, and other varieties	30	18	23	20	28	23	20
Hay in sheaf	5	3½	4	4	3½	4	3½
Grasses and their seeds	10	7	9	9	9½	8½	7
Chaff—Oaten, wheaten, lucerne, and other varieties	50	34	38	30	48	28	32
Ensilage and other prepared cattle fodder	20	15	12	13	17	14	13
Sorghums and millets	10	8	7½	7½	9	9	7½
Commercial fibres, hemp, and flax	15	13	6	6	14	12	10
Pumpkins, green fodder, and fodder roots	12	8	10	8	10	9	9
Broom millet, ready for manufacture	10	6	6½	8	9	9	9
Farm seeds, including canary seed	13	9	10	8	11	8	10
Totals	175	121½	126	113½	159	124½	121

DISTRICT COMPETITIONS ("B" Grade)—*continued.*

—	Maximum points.	Mount Larcom.	Oakey.	Kingaroy.	Brisbane Valley.	Northern Darling Downs.	Nanango.
Wool, &c.—							
Scoured wool	10	8	9	5	8	10	5
Greasy wool	70	63	70	55	45	65	55
Mohair	10	6	9	6	7	8	5
Totals	90	77	88	66	60	83	65
Enlarged Photographs—							
Of District scenery and locally bred live stock	5	3	4	4	4	4	2
Ladies' and Schools Work and Fine Arts—							
Needlework and knitting ..	25	18	12	18	25	16	14
School needlework	5	1	1	2½	5	1½	2
Fine arts	5	3	3	5	3	4	4
School work—Maps, writing, &c.	10	6	8	7	8	5	9
Totals	54	23	24	32½	41	26½	29
Effective Arrangement—							
Comprehensiveness of view ..	20	16	16	14	16	15	14
Arrangement of sectional stands	25	16	20	16	18	15	16
Effective ticketing	10	7	7	5	7	5	5
General finish	25	19	21	15	21	18	15
Totals	80	58	64	50	62	53	50

SUMMARY OF POINTS.

Dairy produce	170	119	146½	147½	117	154	142
Foods	120	96	97	97	95½	88	86½
Fruits, culinary, vegetables, roots, &c.	220	162	131	158	186	148	134
Cereals and by-products	150	100	111	94	114	113	103
Woods	40	30	30	35	40	30	30
Hides and home preserved skins ..	15	13	12	11	11	10	10
Tropical products	120	79	38	52	64	45	45
Minerals	55	34	16	28	36	23	24
Hay, chaff, fodder, &c.	175	121½	126	113½	159	124½	121
Wool, &c.	90	77	88	66	60	83	65
Enlarged photographs	5	3	4	4	4	4	2
Ladies' and schools work and fine arts	45	28	24	32½	41	26½	29
Effective arrangement	80	58	64	50	62	53	50
Totals	1,285	920½	887½	888½	989½	902	841½

First and Chairman's Trophy, Brisbane Valley; Second, Mount Larcom; Third, North Darling Downs.

ONE FARM.

FOUR EXCELLENT ENTRIES.

There was convincing proof that life in the country can be made pleasant where there is harmony in family associations; and that homes in the country have pleasures and enjoyments in many ways not known in the towns and cities. The maximum number of points was fixed at 656, out of which Mr. Ponton, who won last year, secured 510½. Mr. J. T. Whiteway, of Buderim, was second, with 505½, being only five points behind Mr. Ponton. Mr. E. J. Rossow, of Nanango, was third, with 482, and Mr. J. Beck, from the Stanwell district, of Central Queensland, fourth, with 480. There is thus shown how close was the competition. Details of the awards are:—

	Maximum Points.	J. T. Whiteway, Buderim.	E. J. Rossow, Nanango.	J. Beck, Stanwell.	W. D. Ponton, Tuggerah, N.S.W.
PRODUCE—					
Butter	25	22½	19	22	21½
Eggs	5	3	2	2½	5
Totals	30	25½	21	24½	26½
FOODS—					
Hams and bacon (15 lb.)	20	15	17	17	19
Honey and by-products	15	15	8	7	12
Beeswax	5	3	2	2	4
Bread, scones	5	4	5	4	5
Confectionery	5	5	4	4	4
Home cookery	7	6	6	5	5
Lard, tallow, and animal oils	5	4	4	5	5
Totals	72	58	54	54	62
FRUITS, VEGETABLES, AND ROOTS—					
Fresh fruits	25	20	10	15	12
Preserved fruits, jams, and jellies	15	13	10	12	13
Crystallised and dried fruits	10	9	6	7	9
Preserved and dried vegetables, pickles, and sauces	15	11	8	8	12
Fresh vegetables	15	13	12	11	11
Table pumpkins	10	8	9	8	9
Potatoes, English and sweet	20	13	19	10	13
Nuts	7	6	1	3	2½
Vegetable seeds	5	4	5	0½	5
Roots, all kinds	15	14	9	11	11
Home-made meals	3	3	2	2½	1½
Totals	140	114	91	88	99
CEREALS AND BY-PRODUCTS—					
Wheat	25	6	11	9	24
Maize	25	24	25	18	24
Barley, oats, rye, and rice	20	8	13	16	20
Home-made meals	10	9	10	8	10
Totals	80	47	59	51	78
TROPICAL PRODUCTS—					
Sugar-cane	30	18	10	17	4
Cotton in seed	20	10	12	18	14
Coffee	6	4	4	5	5
Tobacco leaf	10	7	7	7	8
Totals	66	39	33	47	31

ONE FARM—*continued.*

	Maximum Points.	J. T. Whiteway, Buderim.	E. J. Rossow, Nanango.	J. Beck, Stanwell.	W. D. Ponton, Tuggerah, N.S.W.
HAY, CHAFF, FODDER, &c.—					
Hay	20	16	18	20	20
Hay in sheaf	5	4	5	3½	5
Grasses and seeds	10	10	8	9	10
Chaff	20	17	19	20	17
Ensilage	15	13	15	14	9
Cattle fodder	15	14	15	13	11
Sorghum and millet	10	8	9	10	9
Broom millet	10	8	9	10	9
Farm seeds	7	6	6	5	7
Commercial fibres	10	10	8	7	10
Totals	122	106	112	111½	107
WOOL—					
Greasy	20	18	20	15	18
Mohair	5	3	5	5	4
Totals	25	21	25	20	22
Drinks, &c.	15	12	10	10½	9
WOMEN'S AND CHILDREN'S WORK—					
Needlework	10	9½	9	6	5
Fine arts	5	2	2	1	3
Fancy work	15	10	9	8	6
School work	5	5	4	4	3
School needlework	5	2	2½	3	2
Totals	40	28½	26½	22	19
Miscellaneous	10	9	7	7	10
Plants and seeds	6	6	5	5	5
Useful articles	10	9	7½	10	10
EFFECTIVE ARRANGEMENT—					
Comprehensiveness	10	8	9	9	8
Arrangement	10	7	8	7	9
Ticketing	5	4½	3	3½	4
Finish	15	11	11	10	11
Totals	40	30½	31	29½	32
SUMMARY.					
Produce	30	25½	21	24½	26½
Foods	72	58	54	54	62
Fruits and vegetables	140	114	91	88	99
Cereals and by-products	80	47	59	51	78
Tropical products	66	39	33	47	31
Fodder	122	106	112	111½	107
Wool	25	21	25	20	22
Drinks	15	12	10	10½	9
Women's and children's work	40	28½	26½	22	19
Miscellaneous	10	9	7	7	10
Plants and seeds	6	6	5	5	5
Useful articles	10	9	7½	10	10
Arrangement	40	30½	31	29½	32
Grand Totals	656	505½	482	480	510½

DISTRICT FRUIT CONTESTS.

Queensland's vast orchard wealth was illustrated remarkably by the imposing displays in the fruit pavilion. The bananas, in the opinion of the judge (Mr. A. G. Gordon), constituted the best exhibit for the past five years. The citrus exhibits were a profusion of excellence. A feature was an apple trophy from The Summit, the fruit being arranged in an imposing pyramid. It was awarded first prize. The pineapples were a delight to behold. Mr. J. P. Pringle (Woombye) gained first prize in smooth leaf pineapple and canning varieties. He practically swept the board in this branch, gaining the trophy for five pines in cases packed for export. The whole display in the pavilion was most effectively arranged by Mr. T. H. Brown, of Montville, and his assistants. Custard apples, strawberries, jack fruit, mandarins, oranges, papaw, grape fruit, and lemons were in a profusion of excellence, and drew from admiring crowds well deserved admiration. The judges, Messrs. A. G. Gordon, Wamuran, H. Wilmott, Victoria Point, and N. C. Richards, Howard, were unanimous in their praise of the general quality of all fruit sent in, both for the competitors and non-competitors' sections. Gayndah won the annual shield for the best display of pines, bananas, and citrus. For bananas the Cooran and Kin Kin Fruitgrowers' Association again won the shield. This association has now won the shield every year since its inception six years ago. A very noteworthy exhibit was a bunch of cavendish bananas shown by Mr. H. Cooper, Sarina. Details:—

	Possible Points.	Buderim.	Cooran and Kin Kin.	Gayndah.	Montville.	Palmwoods.	Woombye.
Bananas	35	27	33	..	27	31	29
Pineapples	35	$27\frac{3}{8}$	$20\frac{2}{8}$	..	$24\frac{1}{2}$	$30\frac{2}{3}$	$30\frac{1}{2}$
Citrus fruits	35	27	14	33	32	32	28
Custard apples	10	6	5	..	9	7	7
Papaws	10	8	8	..	8	9	8
Strawberries	10	7	6	..	5	10	7
All other fruits	10	7	7	..	8	9	7
Grading and packing in export classes	35	$26\frac{1}{3}$	$20\frac{1}{3}$	$11\frac{2}{3}$	$26\frac{2}{3}$	$30\frac{1}{3}$	$28\frac{1}{3}$
General display	20	17	$14\frac{1}{2}$	$18\frac{1}{2}$	18	$18\frac{1}{2}$	$16\frac{1}{2}$
Totals	200	153	$128\frac{1}{2}$	$63\frac{1}{6}$	$158\frac{1}{6}$	$177\frac{1}{2}$	$161\frac{1}{3}$

BANANA SHIELD.

	Quality.	Grading.	Packing.	Total.
COORAN AND KIN KIN—				
Cavendish	28	22	23	73
Lady Fingers	6	..	..	6
Sugars	2	..	..	2
Other varieties	4	..	..	4
				85
PALMWOODS—				
Cavendish	26	22	22	70
Lady Fingers	7	..	..	7
Sugars	2	..	..	2
Other varieties	2	..	..	2
				81

DISTRICT FRUIT CONTESTS—*continued.*

BANANA SHIELD—*continued.*

	Quality.	Grading.	Packing.	Total.
WOOMBYE—				
Cavendish	24	22	21	67
Lady Fingers	8	..	..	8
Sugars	3	..	..	3
Other varieties	2½	..	..	2½
				80½
BUDERIM—				
Cavendish	22	21	20	63
Lady Fingers	9	..	..	9
Other varieties	2	..	..	2
				74
MONTVILLE—				
Cavendish	22	21	18	61
Lady Fingers	5	..	..	5
Sugars	1½	..	..	1½
Other varieties	3	..	..	3
				70½

CITRUS SHIELD.

GAYNDAH—				
Oranges	19	10	10	39
Mandarins	18	10	10	38
Lemons	10	2	3	15
Other varieties	3	..	..	3
				95
MONTVILLE—				
Oranges	19	9	10	38
Mandarins	18	10	10	38
Lemons	7	2	3	12
Other varieties	3½	..	..	3½
				91½
PALMWOODS—				
Oranges	19	10	9	38
Mandarins	18	10	10	38
Lemons	7	2	3	12
Other varieties	3	..	..	3
				91
WOOMBYE—				
Oranges	17	9	8	34
Mandarins	17	8	8	33
Lemons	5	2	3	10
Other varieties	3	..	..	3
				80

DISTRICT FRUIT CONTESTS—*continued.*

CITRUS SHIELD—*continued.*

	Quality.	Grading.	Packing.	Total.
BUDERIM—				
Oranges	16	8	7	31
Mandarins	16	8	8	32
Lemons	8	2	2	12
Other varieties	3	..	..	3
				78
COORAN AND KIN KIN—				
Oranges	8	4	4	16
Mandarins	9	4	4	17
Lemons	3	1	1	5
Other varieties	2	..	..	2
				40

PLATE 82.—KEEN JUDGES OF HORSEFLESH.

Professor E. J. Goddard (Dean of the Faculty of Agriculture, Queensland University) and Major-General Spencer Browne were interested in the Hacks and Hunters.

MILKING TESTS.

ANOTHER AUSTRALASIAN ENTRY RECORD.

The results of this year's milking contests reveal remarkable figures, and illustrate to all who have any knowledge of the dairying industry the high standard of quality attained by Queensland dairy breeders. The stewards of the section, Messrs. A. M. Hunt and J. Stimpson, both well-known breeders, spoke in high terms of what were truly great performances.

Those who undertake the supervision of the milking contests have no easy task, for not only has each milking to be closely watched, but the official who does the testing has a long and tedious time. There is also the necessity for some one other than the owner to be present at the milking of each cow or heifer, in which respect voluntary work was performed by many interested in the tests. For this assistance the supervising stewards expressed their appreciation. The first prize was won by Mr. B. O'Connor, with his Australian Illawarra Shorthorn, Rosette of Wilga Vale, which, with the yield of 5.8192 lb. butter fat, received 46.55 points. The reserve honour was secured by Mr. A. T. Waters for his Australian Illawarra Shorthorn, Fussy V. of Railway View, with 5.1486 lb. of butter fat, for which 46.09 points were allotted. Last year, Mr. A. Caswell won the prize with his Illawarra Milking Shorthorn, Rosie 4th of Greyleigh, with 4.9271 lb. of butter fat. The yield of Mr. O'Connor's Rosette of Wilga Vale is, therefore, ahead of what was recorded last year.

Mr. L. Anderson, Senior Herd Tester for the Department of Agriculture, in speaking on the gound milking tests, remarked that there had been a record for Australasia in the number of cattle that had been entered. The returns showed that the standard was well up to previous years. The competition was carried out at each show for a period of forty-eight hours, commencing on the Saturday afternoon previous to the opening. In the younger classes high production was particularly noticeable, and in the heifers under 3 years old there were some wonderful returns. The competitions were for all breeds, the Australian Illawarra Shorthorns being strongly represented, and there were a fair number of Jerseys, Friesians, and Ayrshires.

The winner of the principal event, Rosette of Wilga Vale, which carries with it the title of champion, is a typical Australian Illawarra Shorthorn. Another animal to give an excellent yield was that confined to the Jersey breed, which was won by Mr. E. Burton's cow, between the ages of three and four years, Oxford Daffodil.

Cow, four years or over, averaging the greatest daily yield of butter fat for 48 hours
Points for lactation period being conceded.

	Milk.	Fat.	Butter Fat	Points.	Lact. Points.	Total.
	Lb.	Per cent	Lb.			
B. O'Connor's Rosette of Wilga Vale (A.I.S.)—						
Night	21·7	4·4	·9548	..	..	..
Morning	27·1	3·8	1·0298	..	..	..
Noon	22·3	5·0	1·1150	..	..	..
Night	22·6	4·0	·9040	..	..	..
Morning	26·1	3·4	·8874	..	..	..
Noon	22·1	4·2	·9282	..	..	..
Total, 48 hours; average, 24 hours	141·9	..	5·8192 2·9096	.. 46·55	.. Nil	.. 46·55
A. T. Waters' Fussy V. of Railway View (A.I.S.)—						
Night	23·2	3·5	·8120	..	..	..
Morning	17·2	4·1	·7052	..	..	..
Noon	14·8	4·4	·6512	..	..	..
Night	15·8	4·3	·6794	..	..	..
Morning	17·7	4·2	·7434	..	..	..
Noon	15·3	4·5	·6885	..	..	..
Total, 48 hours; average, 24 hours	133·5	..	5·1486 2·5743	.. 41·19	.. 4·9	.. 46·09

MILKING TESTS—*continued.*

Cow, four years or over, averaging the greatest daily yield of butter fat for 48 hours. Points for lactation period being conceded—*continued.*

	Milk.	Fat.	Butter Fat.	Points.	Lact. Points.	Total.
	Lb.	Percent.	Lb.			
J. Phillips's Myrtle IV. of Lemon Grove (A.I.S.)—						
Night	23·9	3·1	·7409	..	..	..
Morning	26·6	3·4	·9044	..	..	..
Noon	23·8	3·7	·8806	..	..	..
Night	23·4	4·1	·9594	..	..	..
Morning	25·8	3·1	·7999	..	..	..
Noon	23·1	3·7	·8547	..	..	..
Total, 48 hours; average, 24 hours	146·6	..	5·1398 2·5699	.. 41·12	.. 1·1	.. 42·22

Cow, three years old and under four years, averaging the greatest daily yield of butter for 48 hours. Points for lactation period being conceded.

E. Burton and Sons' Oxford Daffodil (Jersey)—						
Night	15·6	6·2	·9672	..	..	..
Morning	16·2	4·8	·7776	..	..	..
Noon	14·1	6·0	·8460	..	..	..
Night	14·5	5·7	·8265	..	..	..
Morning	15·4	4·5	·6930	..	..	..
Noon	13·1	5·2	·6812	..	..	..
Total, 48 hours; average, 24 hours	94·4	..	4·7915 2·3957	.. 38·33	.. Nil	.. 38·33
D. Spoor and Sons' Emma XI. of Springdale (A.I.S.)—						
Night	16·4	4·0	·6560	..	..	..
Morning	18·5	3·9	·7125	..	..	..
Noon	14·5	4·3	·6235	..	..	..
Night	14·3	3·9	·5577	..	..	..
Morning	17·3	3·9	·6747	..	..	..
Noon	13·4	4·1	·5494	..	..	..
Total, 48 hours; average, 24 hours	94·4	..	3·7828 1·8914	.. 30·26	.. 5·0	.. 35·36
J. H. Wade's Duchess of Wadedale (A.I.S.)—						
Night	16·1	4·5	·7560	..	..	..
Morning	17·2	4·1	·7502	..	..	..
Noon	14·8	4·4	·6512	..	..	..
Night	15·8	4·3	·6794	..	..	..
Morning	17·7	4·2	·7434	..	..	..
Noon	15·3	4·5	·6885	..	..	..
Total, 48 hours; average, 24 hours	118·0	..	4·2239 2·1118	.. 33·79	.. Nil	.. 33·79

MILKING TESTS—*continued.*

Heifer, under three years old, averaging the greatest daily yield of butter fat for 48 hours. Points for lactation period being conceded.

——	Milk.	Fat.	Butter Fat	Points.	Lact. Points.	Total.
J. Phillips's Melba of Sunny View (A.I.S.)—						
Night	18·2	2·9	·5278	..	..	..
Morning	20·9	2·5	·5225	..	..	..
Noon	18·4	3·1	·5704	..	..	..
Night	19·9	3·2	·6368	..	..	..
Morning	21·5	3·0	·6450	..	..	..
Noon	19·1	3·4	·6494	..	..	..
Total, 48 hours; average, 24 hours	118·0	..	3·5519 1·7759	.. 28·41	.. Nil	.. 28·41
Hickey and Sons' Glendalough Queen (A.I.S.)—						
Night	13·0	3·5	·4550	..	..	..
Morning	15·7	2·9	·4553	..	..	..
Noon	12·6	3·4	·4284	..	..	..
Night	12·8	3·3	·4224	..	..	..
Morning	16·0	3·0	·4800	..	..	..
Noon	12·0	3·4	·4080	..	..	..
Total, 48 hours; average, 24 hours	82·1	..	2·6491 1·3245	.. 21·19	.. 7·0	.. 28·29
J. Williams' Bonny Star of Lisieux (Jersey)—						
Night	8·5	5·8	·4930	..	..	..
Morning	10·1	4·9	·4949	..	..	..
Noon	8·4	6·4	·5376	..	..	..
Night	8·8	5·7	·5016	..	..	..
Morning	10·1	4·9	·4949	..	..	..
Noon	8·9	5·5	·4895	..	..	..
Total, 48 hours; average, 24 hours	54·8	..	3·0115 1·5057	.. 24·09	.. 3·8	.. 27·89

Cow, four years or over, averaging the greatest daily yield of butter fat for 48 hours.

——	Total Milk.	Total Butter Fat	Average Butter Fat
	Lb.	Lb.	Lb.
B. O'Connor's Rosette of Wilga Vale (A.I.S.)	141·9	5·8192	2·9096
A. T. Waters' Fussy V. of Railway View (A.I.S.) ..	133·5	5·1486	2·5743
J. Phillips's Evelyn of Sunny View (A.I.S.)	149·4	4·9943	2·4971

Cow, three years old and under four, averaging the greatest daily yield of butter fat for 48 hours.

E. Burton and Sons' Oxford Daffodil (Jersey)	88·9	4·7915	2·3957
S. J. Lester's Susie IV. of Hillfields (A.I.S.)	109·8	4·3480	2·1740
J. H. Wade's Duchess of Wadedale (A.I.S.)	97·6	4·2237	2·1118

Heifer, under three years, averaging the greatest daily yield of butter fat for 48 hours.

J. Phillips's Melba of Sunny View (A.I.S.)	118·0	3·5519	1·7759
F. O. Hayter's Emma of Spurfield (A.I.S.)	96·6	3·4739	1·7369
A. Pickel's Stella of Blacklands (A.I.S.)	102·3	3·4334	1·7167

MILKING TESTS—*continued.*

Jersey cow or heifer, any age, averaging the greatest daily yield of butter fat for 48 hours.

	Total Milk.	Total Butter Fat.	Average Butter Fat
E. Burton and Sons' Oxford Daffodil	88·9	4·7915	2·3957
J. Williams' Carlyle Pamela	87·4	4·2493	2·1246
J. Hunter and Sons' Pine View Buttercup	78·5	4·0938	2·0469

Dairy Cow, any age, producing greatest quantity of butter fat in 273 days test—

J. Collin's Duchess of Calton (Jersey), 634 lb. of butter fat.

Cow, yielding the greatest quantity of milk in 48 hours:—

J. Phillips's Evelyn of Sunny View (A.I.S.), 149.4 lb.

B. O'Connor's Rosette of Wilga Vale (A.I.S.), 141.9 lb.

A. T. Waters's Fussy V. of Railway View (A.I.S.), 133.5 lb.

Royal National Champion Butter Fat Test, cow or heifer (pure bred), averaging greatest daily yield of butter fat for 48 hours, lactation points being conceded. First prize, £5 and champion ribbon.

B. O'Connor's Rosette of Wilga Vale (.A.I.S.), 46.55 points (champion).

A. T. Waters's Fussy V. of Railway View (A.I.S.), 46.09 points (reserve champion).

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JULY, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING JULY, 1930 AND 1929, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	July.	No. of Years' Records.	July, 1930.	July, 1929.
	In.		In.	In.
North Coast.				
Atherton	0·98	29	1·89	0·52
Cairns	1·56	48	2·95	0 46
Cardwell	1·36	58	1·29	0·18
Cooktown	0·98	54	0·99	0·54
Herberton	0·78	43	1·16	0·29
Ingham	1·51	38	1·09	0·50
Innisfail	4·66	49	5·84	1·49
Mossman	1·31	17	0·70	0·03
Townsville	0·63	59	0·31	0·06
Central Coast.				
Ayr	0·70	43	0·18	..
Bowen	0·92	59	0·20	0·06
Charters Towers ..	0·64	48	0·08	..
Mackay	1·65	59	0·30	0·22
Proserpine	1·31	27	3·10	0·05
St. Lawrence.. ..	1·28	59	0·60	0·02
South Coast.				
Biggenden	1·34	31	1·41	0·12
Bundaberg	1·81	47	1·32	0·04
Brisbane	2·23	79	1·25	0·53
Caboolture	2·16	43	1·56	0·32
Childers	1·68	35	1·70	0·04
Crohamhurst ..	2·87	37	3·33	0·32
Esk	1·96	43	2·43	1·19
Gayndah	1·45	59	0·86	0·05
Gympie	2·14	60	1·54	0·55
Kilkivan	1·62	51	1·40	0·39
Maryborough .	1·88	58	0·96	0·03

Divisions and Stations.	Average Rainfall.		Total Rainfall	
	July.	No. of Years' Records.	July, 1930.	July, 1929.
	In.		In.	In.
South Coast—continued:				
Nambour	2·70	34	1·60	0·30
Nanango	1·67	48	1.51	0·25
Rockhampton ..	1·42	43	1·26	..
Woodford	2·36	43	2·00	0·38
Darling Downs.				
Dalby	1·71	60	3·02	0·57
Emu Vale	1·54	34	1·49	0·57
Jimbour	1·55	42	1·60	0·35
Miles	1·64	45	1·12	0·39
Stanthorpe	2·03	57	1.93	1·11
Toowoomba ..	2·02	58	2·55	0·69
Warwick	1·80	65	2·99	0·76
Maranoa.				
Roma	1·43	56	1·28	0·19
State Farms, &c.				
Bungeworgorai ..	1·34	16	0.90	0·06
Gatton College ..	1·32	31	0.96	0·65
Gindie	0·92	31	0·55	..
Hermitage	1·68	24	2·08	0·76
Kairi	1·16	16	1·52	0·45
Mackay Sugar Experiment Station ..	1·42	33	..	0 16
Warren	1·12	15	..	..

GEORGE G. BOND, Divisional Meteorologist.

DISEASES OF THE PIG.*

E. J. SHELTON, H.D.A., Senior Instructor in Pig Raising.

In the preparation of information dealing with Diseases of the Pig, an endeavour has been made to describe in the simplest language possible the various conditions, abnormal and otherwise, associated with the incidence or appearance of disease in swine. The suggested preventive measures and methods of treatment are such as may be successfully carried out by any careful farmer, excepting only in cases where the services of a qualified veterinarian are advised, and in these cases the best methods to follow will be suggested on the spot by the surgeon himself.

The pig is notoriously a bad patient and a difficult animal to handle when indisposed, hence great stress has been laid throughout this treatise on the necessity of preventive measures, for prevention is not only much better than cure, but is invariably less costly and a great deal more satisfactory.

In dealing with methods of treatment and the engagement of qualified aid, it has been realised there are numerous difficulties in the way, because Departmental officers or practising veterinarians are not always immediately available in town or country districts. Again, therefore, we stress that prevention is better than cure, and we might even qualify this further by adding prevention is more necessary than cure.

Mr. Shelton's bulletin, representing as it does a vast amount of labour and the fruits of careful study and observation, is a welcome contribution to current pig literature.—EDITOR.

A SOUND knowledge of the business of pig raising and a liking for the job are attributes without which success would not be possible. Absolute cleanliness in all operations and the realisation that the business cannot possibly prove profitable unless conducted along correct lines, indicates a line of thought along which we work in discussing prevention and in dealing in detail with the different conditions as they arise. The provision of suitable accommodation for all the animals kept, and a regular and efficient food and water supply are the initial requirements, nor would it be safe to suggest entry into the industry unless these be arranged for. Equally necessary are foundation animals from healthy, well-developed stock of strains noted for prolificacy, rapid growth, and suitability for market requirements. Suitable stock are, in most instances, readily available at comparatively low rates, and, even where these cannot be secured locally, they can be selected from reputable herds in clean districts, and be safely transported at a minimum of cost. The provision of one or two "hospital" pens, into which newly purchased stock may be placed for a few days, and to which stock may be transferred when noted to be "off colour," are advised; such pens are an

* The typescript and illustrations of the Farmers' Bulletin on Diseases of the Pig have been submitted to the Chief Inspector of Stock, Major A. H. Cory, M.R.C.V.S., Department of Agriculture and Stock, Brisbane, Queensland.

Copies of the Bulletin may be had gratis on application to the Under Secretary, Department of Agriculture and Stock, Brisbane, Queensland.

In the compilation of this paper the writings of recognised authorities in other States and other parts of the world have been drawn on, and the assistance thus received, also that freely given by other Departmental officers, is acknowledged gratefully.

immense advantage and a necessity, and their provision should not be looked upon as merely the fad of a theorist, for in the stock world hospital accommodation is just as essential as it is in the world of human beings, especially where a large number of animals are kept and where the area available for grazing is limited. These pens should be kept in readiness at all times and be in an hygienic condition and capable of being kept clean.

The provision of a supply of the commoner drugs, castor oil, Epsom salts, &c., is certainly essential, especially in centres where it is inconvenient to secure these as required, at short notice. The pig is such a bad patient that, when he is sick, he is down and out and cares but little whether he lives or dies, hence immediate attention is necessary once it is noticed he is off tucker and out of sorts. Much patience is necessary in attending to sick pigs and it is urged that the owner or attendant should be as reasonable as possible in handling the patient. It is not always correct to assume that "the back of the farm axe" is the best remedy if the pig shows signs of ill health.

The Incidence of Disease.

The incidence of disease in pigs may be reasonably grouped under the following headings, all of which have a direct bearing upon the general care, breeding, feeding, and management of this class of stock —i.e., ailments and diseases may be due to or exaggerated by—

(1) Dietetic causes (neglected feeding, impure or unsuitable foods).
(2) Hygienic causes (filthy sties, low-lying, damp, and badly drained areas).
(3) Parasitic infestation (lice, worms).
(4) Constitutional weakness (predisposing stock to ill health).
(5) Hereditary predisposition (particularly in abnormalities of the sexual organs).
(6) Local causes (accidents, bruising, malformations).
(7) Diseases due to specific organisms or the products of germ life (fevers, poisoning).
(8) Unknown or unspecified causes.

As to which (one or more) of these causes would be the responsible one in the case of any particular disease would probably be difficult to decide upon, but in almost every instance the occurrence of disease indicates neglect in one form or other for, where healthy, well-developed stock are kept under conditions favourable to development, disease is not likely to take toll, nor is there other than an ordinary business risk in so far as finances are concerned.

INDICATIONS OF ILL HEALTH.

Ante-mortem Inspection.

To the experienced eye, it is not difficult to determine when an animal is sick or when ill health is developing, but to the inexperienced farmer ante-mortem inspection is quite a difficult job. It is equally difficult to determine with any degree of accuracy the possible cause. Taking the temperature of the animal, recording the pulse and making other necessary observations is equally difficult, especially as this part of the business requires detailed attention, but when the powers of

observation have been developed, it is not necessarily difficult, and one soon learns whether an animal requires medicine or other forms of treatment. Usually the first indication of an abnormal condition is that the animal has no desire for food, he is "off tucker," but has an abnormal thirst and is inclined to hide away in the corner of the yard, either under cover of straw, grass, or exposed to the elements. Such an animal appears depressed, dull and tired, the head hangs limp, the back is arched, the tail hangs lifeless, he moves painfully, if at all, and takes little or no notice of other stock or of his attendants. The hair, which is ordinarily glossy, appears rough and staring, standing on end as the animal arches the back and drops the head; the skin is hot, dry, and there may be unusual tightness (hidebound). The bowels are invariably affected early in the attack and constipation or diarrhœa may be noted, the urine is scanty, yellowish, and evil smelling. The bodily temperature varies, in fevers it is high, in some disorders it is variable and below normal (102·6 deg. Fahr.). The pulse is either rapid or very faint, the breathing is short, jerky, painful or rapid, while coughing or difficult breathing may be a feature; the nose is hot and dry, and lacks the characteristic beads of healthy perspiration; there may be whitish discharges from the nostrils and eyes, a frothy discharge from the mouth or unnatural discharges from the bowels, bladder, or sexual organs. Dry greyish scurf or scales may form around the eyes as a result of a discharge therefrom, while in diseases of the eye, there may be a sticky discharge, and the eyelids may even become partially glued together, especially after the evening's rest. An irritating cough and heavy breathing indicates affections of the lungs and bronchial tubes. Paleness and inflammation of the mucous membranes of the eyes, nostrils, mouth, and other external openings indicates an anæmic condition, while a distinctly yellowish appearance of these membranes indicates disorders of the liver (jaundice).

Where injuries are responsible for the ailment it is possible examination may indicate inflammation, abscess formation, discharge of pus, growth of proud flesh, fractures, lacerations, or other abnormal conditions with resultant difficulty of movement (stiffness). In diseases of the mammary glands (udders) there may be inflammation and the parts may feel hot and very hard to the touch, or there may be local irritaton and inflammation as in cow pox, or bleeding or the formation of scales where the teats or udders have been lacerated. Dropsical conditions are indicated by extreme obesity with loss of condition, bowel disorders by extreme difficulty in passing the fæces, or by profuse diarrhœa, &c. There are other conditions too, referred to in dealing with individual diseases like paralysis, rickets, in which the limbs are affected and the animal is unable to move about freely.

Post-mortem Examination.

The indications of disease found on an examination of the carcass or viscera (internal organs) after death vary considerably with the nature of the ailments or disease, hence, to become more conversant with these conditions, the farmer should make every effort to study the subject and gain as much practical experience as possible by visiting bacon factories or slaughtering establishments, and noting the condition of the various carcasses and of the viscera, both healthy and diseased. Diseases like tuberculosis (T.B.) are difficult to locate in pigs on ante-mortem inspection, but are usually readily located by the meat inspector

on post-mortem examination. It is these diseases in which there are practically no external symptoms that puzzle the farmer and cause him to doubt the experience or the integrity of the meat inspector or the fairness of the system requiring condemnation in part or whole of infected carcasses or organs, especially as such condemnations are relatively common and are a matter of practically everyday experience on the part of meat inspectors in large slaughtering establishments. It might be mentioned here, too, that occasionally the inspectors classify as boar meat the carcasses of male pigs in which internal testicles are found. In many cases the farmer claims that the pig was properly castrated, but if the inspector finds one or both testicles located internally, or castration improperly carried out, he has no option (except in the case of pigs less than four months old) but to classify the meat as that of a boar pig for which a lower price is paid.

ISOLATION AND TREATMENT OF SICKLY PIGS.

The first step to take when it is noted that pigs are ailing or are sick is to separate them from the rest of the herd and place them in a comfortable, well-lighted, and well-ventilated pen, or in a yard in which there is a good, clean, and dry shelter shed, free from draughts. For convenience sake this is referred to as a hospital pen. Having separated the patients, next make sure that the bowels are in good working order and that the urine is passed freely and without indications of pain. It is urgent that this be done, for most of the diseases to which the pig is subject are exaggerated by bowel disorders and kidney troubles.

A liberal dose of Epsom salts is one of the best preliminaries in treatment, though it is very difficult to find any better than the good old castor oil with which our parents immediately dosed us as soon as we showed any indication of ill health. In the case of the pig the doses should vary from 1 to 4 oz. of Epsom salts, and from one to four tablespoonfuls of castor oil, the smaller dose being for pigs up to three months old with larger doses for stock carrying more age.

Having taken these steps and having seen to the animals' temporary wellbeing, the next step is to set about improving the conditions under which the remainder of the stock are kept; trying to discover the cause of the illness and to make the necessary arrangements for care and treatment of the sick animals.

No "Cure-alls."

One thing it is desirable to remember is that there are no specific "cure-alls" for the diseases of the pig. The most satisfactory remedy is prevention through strictly observing and regularly practising the rules of health. It may seem irksome to be continually cleaning sties and giving detailed attention to the feeding of pigs, but those who are most successful in this business take much greater delight in preventing disease, by following correct methods of management, than they do by the administration of medicine or other forms of treatment. The compulsory drenching of a sick pig is one of the most unpleasant jobs on the farm.

Preventive measures often entail the use of medicines such as castor oil, but this is best given in the food, especially with sows due to farrow or to stock that have been crated up for several days during long railway

or steamship journeys and who need freshening up as a preliminary to taking up life under a new environment. Drenching by force should be avoided at all times if possible, since it does not improve the temperament of a sick pig, and especially in diseases of the lungs or respiratory passages is distinctly dangerous. In using castor oil the best grades only should be used; other oils such as raw linseed oil, and drugs such as Epsom salts, pig powders, &c., may also be added to the food if the pig has not lost his appetite.

It is preferable to give such medicines in the first feed of the day, while the animal is still very hungry.

THE ADMINISTRATION OF MEDICINE TO PIGS.

How to Use Castor Oil.

To prepare castor oil for use, proceed as follows:—(1) Secure one or two dippers of wheaten bran (for preference), or pollard, cereal meal, or waste bread crumbled up; place in a clean bucket; now measure out the amount of oil to be given and pour it into the dry bran or meal, mix thoroughly, and then, using milk or warm skim milk, reduce the mixture to the consistency of thick cream. Add just enough table salt (say, half a teaspoonful) to disguise the taste of the oil and give with the mash. Compel the animal to take vigorous exercise three or four hours after being dosed, and the result will invariably be satisfactory. Allow ample clean drinking water.

Many medicines can be administered in this fashion, and some others, such as sweet spirits of nitre, may to advantage be added to the drinking water.

Where, however, the state of an animal is such as to make compulsory dosing necessary, it should not be shirked, and the drenching bit or drenching horn (a cow's horn suitably prepared makes a good one) comes into play. Two warnings are necessary here: Drenching apparatus must be scrupulously clean and—never persist in giving a drench to an animal when it is obviously unable to swallow freely. Furthermore, no attempt should be made to drench a pig suffering from diseases of the respiratory passages or lungs, such as bronchitis, pleurisy, &c., since in these diseases the respiratory passages are inflamed and very tender, and if the liquid penetrates into the bronchial tubes serious complications will probably result.

In any case, when an animal is given a drench it must be properly restrained preferably with a strong rope or piece of webbing placed in its mouth behind the tusks and over the snout, the rope being secured to a stout post or rail in such a position that the head can be lifted or lowered in a moment if required.

Do not be in a hurry while drenching. Give ample time for the animal to swallow every mouthful and lower the head at once if there is any indication of coughing or choking.

If the animal weighs less than 100 lb., an attendant, lifting and straddling the animal's back and at the same time grasping both his forelegs, should raise the pig's head high enough to allow the drenching horn to be placed in position. Take plenty of time and give the animal a chance to rest.

At the same time, the animal should be "gagged" by placing a small piece of soft wood between its upper and lower jaw, thus allowing room for a tube or horn to be passed into the mouth. Use a piece of wood not less than 6 inches in length and be sure it is clean and free from splinters.

It is advisable to use a horn with fluids. When a powder has to be given the best method is to make it into a ball with honey or treacle, and if necessary flour. Then using a fairly long piece of wood or a ladle, deposit the mixture on the back of the tongue. If it is placed further forward in the mouth it will almost certainly not be swallowed. Some medicines may be given in pill form.

Pig Powders, Proprietary Medicines, &c.

The author is often asked if he recommends the use of well-advertised pig powders and medicines, salt and bone licks, &c. The answer is invariably that there is no doubt many of these (especially those of long standing and well-established reputation) possess to a greater or lesser extent some healing power and are of value when judiciously used. Some, like salt and bone licks, are very necessary and are certainly recommended, but medicines are quite valueless unless their use is accompanied by a thorough clean-up of the pig premises and by improved methods of accommodating, feeding, and caring for the pigs, and even more important still by strictly culling out all unsatisfactory animals, followed by the introduction of stock carrying better breeding and stronger disease-resisting powers. Stock of low vitality and with weak constitutions are prone to all sorts of trouble and should not be retained on the farm.

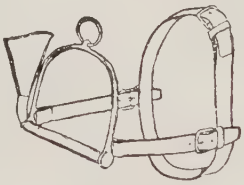


PLATE 83.

FIG. 1.—A suitable type of Pig Drenching Bit of special value to the breeder of valuable pigs. The bit is inserted in the pig's mouth, and the straps are passed round the head at the back of the ears. It simplifies drenching.

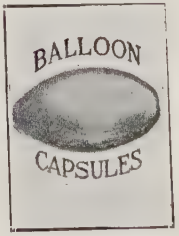


PLATE 84 (Fig. 2).—WORM CAPSULE READY FOR USE.

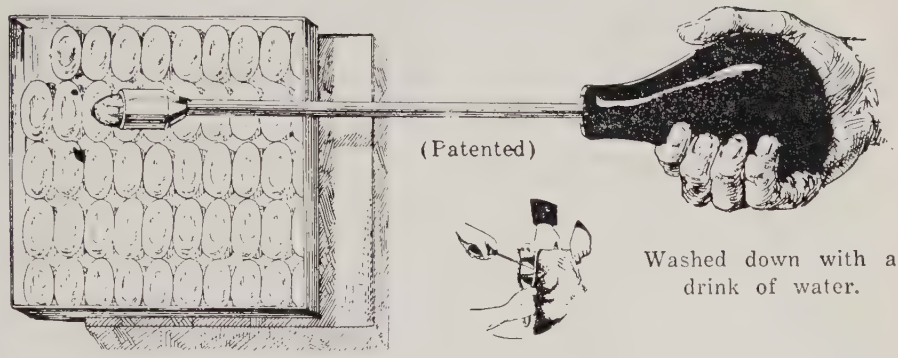


Plate 85 (Fig. 3).—Worm Capsule Outfit.

(Showing patent metal instrument for use in administering capsule, the jaw opener, and box of capsules).

Plate 86.

Fig. 4.—A convenient instrument for inserting into the pig's mouth in order to hold the animal while being drenched or treated. This is a very strong instrument, enabling the operator to handle a heavy sow or boar with comparative ease.

Worm Capsules. (Figs. 1, 2, 3, 4.)

Worm capsules such as are advertised in the Agricultural Press, should contain a full dose of vermifuge (worm medicine) like oil of Chenopodium, Santonin, &c., inside a transparent gelatine covering (the capsule). The special advantages of these capsules are that they are both simple and efficacious if administered correctly. Each capsule carries a stated dose and each pig must be treated separately; thus each pig stands so much better chance of being freed from intestinal parasites. The capsules are usually prepared for animals of varying weights, thus one capsule for a pig weighing 50 lb., two for a pig weighing 100 lb., &c. Repeat doses may also be necessary. Doubtless as time goes on the use of worm capsules will become more general, provided their quality be guaranteed. Some manufacturers supply instruments for use in administering the capsules. Provided the capsules are reasonably priced and of the quality stated, it would be preferable for the inexperienced to depend on them than to attempt drenching an animal about which job they had considerable doubt, especially as capsules may be given in the food. It would, however, be well to obtain Departmental advice before using any remedies of which the farmer has had no previous knowledge.

If the pigs are properly fed and cared for and have ample nutritious food, including greenstuff, there should be no need for the extensive use of pig powders, oils, and similar medicines, but where pigs are sickly and are not doing well and improved feeding and care are not immediately effective, the use of pig powders may be beneficial. It is not difficult to obtain Departmental advice on these matters.

Drugs having as their objective the stimulation of the sexual organs should be used with the greatest caution, and may also be effective in freshening up lethargic animals, but in no instance should dependence be made on the use of sexual stimulants; because healthy, vigorous, well-developed stock should not be in need of artificial stimulants except perhaps during abnormal periods.

Use of Hypodermic Syringe.

Some drugs must necessarily be given with a hypodermic syringe. In muscular and nerve tissue diseases and snakebite where a quick acting drug is called for, it is preferable to have a drug given in this way, but in these cases a qualified official should be engaged to do the work, for an overdose of these specifics is fatal.

Vaccination.

Fortunately pigs in this part of the world are not troubled much with diseases controlled by vaccination and the use of hog cholera serums, mixed infection serums and viruses. The diseases which call for this form of medication include hog cholera or swine fever, swine plague, swine erisipelas, anthrax, foot and mouth disease, and rinderpest. In America, Europe, and parts of the United Kingdom, vaccination appears to have become an absolute necessity.

However, no attempt should be made here to inject serums into pigs unless under strictly official instructions from the State veterinary authorities. It is advisable wherever the owner is doubtful about the nature of the disease from which his animals are suffering, that he should immediately seek the advice of the State officers. With more serious diseases, he is liable to a heavy penalty if he neglects to notify them. Information regarding the nature of various diseases may be had on application to the officers referred to.

Regulations are very strict in all States, so strict as to be regarded by many as irksome; but if the greatest critics of our system could visualise where laxness has led the pig industry in other countries, their criticism would most certainly cease. Rigid supervison has kept us free of most of the ills which afflict stock in other countries. Information as to the regulations controlling import and export of pigs is also available upon application, and should be obtained by all interested in the transport of pigs from one State or country to another.

Rectal Injections.

The enema is often used in the treatment of pigs suffering from acute constipation, stoppage of the bowels, diarrhœa, or other bowel affections. The injection usually consists of warm soapy water to which some form of oil—olive, lucca, salad, or glycerine—has been added. No irritating drugs whatever must be given in this way, otherwise the bowel tissue will be injured. Irrigation of the uterus of breeding sows for diseases of that organ is also to be recommended in certain conditions.

Fumigation.

Here again, where eucalyptus, chloroform, and other drugs are to be introduced through the air passages, it is advisable that veterinarians with a knowledge of the technique of the work be employed.

External Remedies.

These are necessary in the treatment of skin diseases or injuries or for the purpose of freeing the skin of lice or other skin parasites. Spraying is to be recommended in place of dipping if the number of animals to be treated suggests some other form than hand treatment, for wholesale dipping of pigs is by no means an easy task. Dusting with insecticide is well worth consideration, especially with very young pigs. The use of an oiling post to which the animals may go for relief is advised.

PARASITIC INFESTATION.

Internal Parasites of the Pig.

It is essential that the pig breeder should have some knowledge of the various external and internal parasites that infest his stock, and, in this connection, intestinal worms are the most prevalent of those located internally with which he will have to deal.

A prominent overseas author recently stated that more pigs die of intestinal parasites than from contagious diseases. He added that worms cause 90 per cent. of the losses in live stock.

Results of Infestation.

Pigs infested with worms are in just as serious a condition as if affected with contagious disease, though results may not be so apparent or fatal.

Mal-assimilation, debility, &c., from whatever cause it arises, weakens the animal's resistant powers, and makes it a fit subject for attack by internal or external parasites. Animals with sturdy vigorous constitutions are better able to withstand the evil consequences of parasitic infestation than stock less favoured in this respect, the parasites seeming to find their most suitable environment in weakly hosts, this, probably, on account of general debility exercising a depressing influence on the various protective agencies whose function it is to protect the body against infection. Loss of tone in the bowel muscle, by causing constipation, and the retention of poisonous matters in the intestines, also favours parasitic infection; healthy active movement of bowels being opposed to the habits of parasites.

Symptoms of Worm Infestation.

Worms will stunt the growth of the animal, no matter how good the food and care. Though the pig may have a good appetite and eat well, he will, if heavily infested with worms, fail to make headway; his growth will be checked, he will lose flesh, his appetite will become capricious, his skin hidebound and dry and the scurf will flake off in large patches. There may also be a deep "stomach" cough. The animal will rub himself constantly against fences, tree stumps, &c., he will back up and rub his hindquarters against the food troughs, his back will become arched, his flanks tucked up, the nose will be dry and hot, and the eyes glazed, and the throat will be enlarged and "bottle-necked."

Effects on the Pig.

As the disease advances and the parasites become more numerous, the belly will become podgy, the skin hanging over the bones in a dry, tight fashion, and the animal will be inclined to lie in a corner and to

lose heart altogether, he will become anæmic, the mucous membranes will be pale and dull; the bowels are inactive, and sickness gradually overtakes the weakened animal; there may be convulsive pains and colic and finally emaciation may set in, very often with fatal consequences.

The effects of internal parasites on the animal naturally depend upon several factors. The number present is important; in most cases a few parasites in an animal cause no appreciable harm. The age of the pig is another factor influencing the effects of infestation. Intestinal worms cause much more harm to young pigs than to healthy mature animals, and similarly they have greater effect upon stock weakened by lack of suitable foods and vitamines, or by general ill health, or accident. The nature of the food that is given is very important; pigs fed on pasteurised skim milk and similar nourishing foods resist infestation much more readily than offal-fed pigs, or pigs fed largely on dry, fibrous foods.

The manner in which the animal is fed, attended to, and housed, and the amount of green, succulent food he has, are all important factors influencing the resistant powers.

Preventive Measures and Treatment.

In general, to prevent infestation by parasites, the following points should be considered:—

(1) The pigs should be kept growing. The better they are handled and fed the more likely they are to avoid and throw off infestation. Give the young pigs a good start. Old pigs do not apparently suffer much from intestinal worms, but even the old pigs should be well fed and carefully managed so as to keep them in good thrifty condition. Older stock are more subject to infestation by kidney worms than by stomach or intestinal parasites.

(2) Correct feeding of the young pigs may be simplified by arranging separate feeding places so that they can feed apart from the sows. In these places such feed as grain (cracked and boiled or soaked for very young pigs), meat meal, pollard, &c., should be placed, and for preference, each in separate troughs. If these pigs are allowed out on pasture, so much the better, preferably on lucerne, clover, or succulent grasses; skim milk is a valuable addition to the list of foods, and to avoid infection by germs of tuberculosis, the milk should be pasteurised before use.

(3) Free access to charcoal, wood ashes, air-slacked lime, rock salt, may be allowed, these being given "free-choice style," preferably mixed in the form of a mineral mixture and kept in a separate trough, well protected from weather.

(4) Clean pastures and roomy pig paddocks are important. Pastures—grasses and other herbage—are useful, good green lucerne and clover pastures are even better. Succulent pastures are always appreciated, hence the advantages of numerous small paddocks in preference to one or two larger areas.

Ploughing up the old pastures helps wonderfully in getting rid of parasite infestation. Taking the pigs away from the old infected areas and placing them on new pastures and in new pens is to be recommended. Keep the pigs away from infected marshes, slow-running creeks, and stagnant pools.

The provision of a properly constructed concrete bath is a payable proposition. Use some sheep dip or crude oil now and then in this bath.

(5) Do not throw green food out in the mud or on dirty floors. Have a concrete feeding platform and feed them there; keep this platform clean so that the pigs will not pick up infection from dirt; keep the troughs and feeding places free from mud, corn cores, refuse, &c. Use feeding racks for greenstuff.

(6) At all costs avoid using the milk of cows that are suffering from simple or contagious abortion, as it is possible this infected milk may be a primary cause of outbreaks of abortion among breeding sows. All in-pig sows, and particularly those that are heavy in pig, should be carefully housed, as an extra severe frost or a change to cold squally weather may induce abortion. It is believed it often does. The use of musty, mouldy foods and of weak, washy swill is decidedly dangerous.

(7) Drainage is necessary. Keep the pens as dry as possible. Diseases and parasites are always more plentiful in wet seasons and on low swampy areas of ground than on high and dry building sites or in dry, hot seasons.

(8) The life history of parasites should be studied. Study schemes that will evade the worm, the worm eggs, and the embryos at all stages in their life hstory.

(9) Use properly compounded worm remedies; Santonin and calomel are good. The dose is about 5 grains of each to a 100 lb. weight pig. For a 200 lb. pig increase to 7½ grains, and for a 300 lb. pig 5 to 10 grains of each of these drugs. This is called an emergency treatment, and may be given to wormy pigs with advantage.

(10) Feed lightly for two days following, then give a good purge of 3 to 4 oz. of castor oil. Repeat in a fortnight if the animal has not improved on good feeding. The doses given are for a full-grown pig; if treating a baconer or a porker, give about two-thirds of a dose to each animal.

(11) An American recipe which has proved very successful is as follows:—Mix together Santonin, 5 grains; areca nut, 3 drachms; calomel, 3 grains; sodium bicarbonate, 1 drachm. The ingredients should be thoroughly mixed. The quantity named constitutes a dose for a 100-lb. pig. Use twice as much for a 200-lb. pig, slightly more for a 300-lb. pig. Feed should be withheld for at least eighteen hours before giving the above mixture, which should be mixed in a small mass of pollard or else as a drench in warm milk. Repeat the dose in eight to ten days to make sure that all worms are expelled.

(12) Another useful farm recipe is:—Turpentine, half to one tablespoonful; linseed oil (raw), two to four tablespoonfuls. Mix well together, and give as a drench in a small quantity of milk, and follow with a dose of castor oil, this for a full-grown pig, half this quantity for a pig of bacon size.

(13) Powdered areca nut given in the same way in 1½ to 2 drachms doses is also very good. See also references to the use of worm capsules in the paragraphs dealing with administration of medicine to pigs.

INTESTINAL WORMS.*

Internal parasites of the pig that have so far been recorded from Australia may be classed as follows:—

Intestinal Worms.

Ascaris lumbricoides (Lin.). The Long White Worm.

Ancylostoma duodenale (Dub.). Hookworm.

Necator americanus (Stiles). Hookworm.

Macracanthorthynchus hirudenaceus (Pallas). Thorn-headed Worm.

Oesophagostomum dentatum (Rud.). Nodule Worm.

Oesophagostomum longicaudum (Goodey).

Trichuris trichiura (Lin.). Whip Worm.

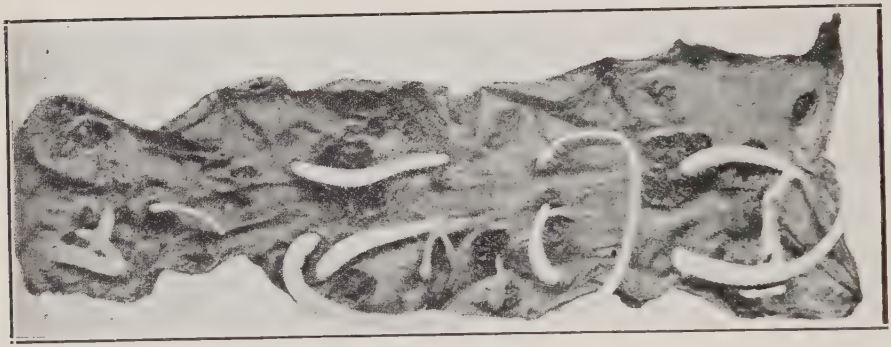


PLATE 87.

Fig. 5.—Portion of pig's intestine, showing Thorn Headed Worms attached to the mucous membrane of the intestines. The worms illustrated were much shrivelled and immature when this photograph was taken.

Stomach Worms.

Arduenna strongylina (Rud.).

Physocephalus sexalatus (Molin).

Hyostrongylus rubidus (Hassal and Stiles).

Gnathostoma hispidum (Fedeh).

* The author is indebted to Mr. F. H. S. Roberts, M.Sc., Veterinary Parasitologist, for a revision of this section of the Diseases pamphlet, also for supplying the names of the various pig parasites.

The illustrations (Plate 88, Figs. 1-2, Plate 89, Figs. 1-5*b*) are the work of Mr. I. W. Helmsing, Illustrator, also of the Entomological Branch, Department of Agriculture and Stock, Brisbane, Queensland.

Lung Worms and Worms Infesting Other Organs.

Metastrongylus apris (Gmelin). (Lungs.)

Chaerostrongylus pudendotectus (Wost). (Lungs.)

Echinococcus granulosus (Botsch). (Lungs, liver, &c) Hydatids.

Cysticercus tenuicollis (Omenta and mesenteries). Water-ball.

Stephanurus dentatus (Dies). (Perirenal tissue, liver, and lungs.) Kidney Worm.

Fasciola hepatica (Lin.). (Liver.) Liver Fluke.

Thus of the fifty-two internal parasites recorded by Baylis as being found in the pig, seventeen have been found in Australia. The most plentiful parasite appears to be the kidney worm, *Stephanurus dentatus.* The percentage of infestation by *Ascaris lumbricoides* is also fairly high, whilst that of the thorn-headed worm, *Macracanthorthynchus hirudinaceus,* and the stomach worms, *Arduenna strongylina* and *Physocephalus sexalatus,* appear, from the information available, to be slowly increasing. The lung worms and whip worms (*M. apris, C. pudendotectus,* and *T. trichiura*) are somewhat rare, whilst the nodule worms *Oesophagostomum* sp. in the pig have yet to be encountered in this State. Australia is fortunate in that the intestinal parasite *Trichinella spiralis* is as yet unknown here. This worm is the cause of that serious disease "Trichinosis." Another worm whose infestations are very common abroad and unknown in Australia is the *Cysticercus cellulosæ*, the cause of pig measle.

The Long White Worm.

(See Plate 88, fig. 1.)

The common round white worms (*Ascaris lumbricoides* (Lin.) are found in nearly all pigs, and occasionally are present in such numbers that portions of the intestines are choked with them as they lie bunched together. They prefer to live in the small intestines, but may also be found in the large bowel, the stomach, the bile ducts, while they have even been found in the œsophagus (the food pipe carrying the food from the mouth to the stomach).

These worms are round in shape, tapering at both ends, are white or yellowish in colour, and have a smooth clear skin. The female is the larger, and is 9 to 15 inches in length; the male is shorter and stouter, and measures 4 to 9 inches in length.

The life history of the Ascaris is now known to be very complicated. The eggs must pass from the body of pig and after passing, if conditions of temperature, moisture, &c., are favourable, hatch in from ten to fourteen days. The young larvæ are swallowed with food, water, &c., and in the case of young pigs from the teats of the mother infected with worm eggs from being in contact with the infected soil of pen. They reach the intestines, make their way into blood vessels, and are carried to lungs. Here further development proceeds until the young worm is coughed up and swallowed, reaching intestines again where they grow to maturity. It is worth stressing that there is grave danger of the young pig becoming infected by sucking the teats of a sow whose udders might be covered with eggs and larvæ picked up in dirty pens.

The worm eggs may be distributed in shallow pools, water troughs, or in old straw heaps; it is safe to say that every pig more than a few days old may thus become infested if worms exist in the herd.

Strict sanitation and immediate attention to the treatment of all affected pigs is strongly advised.

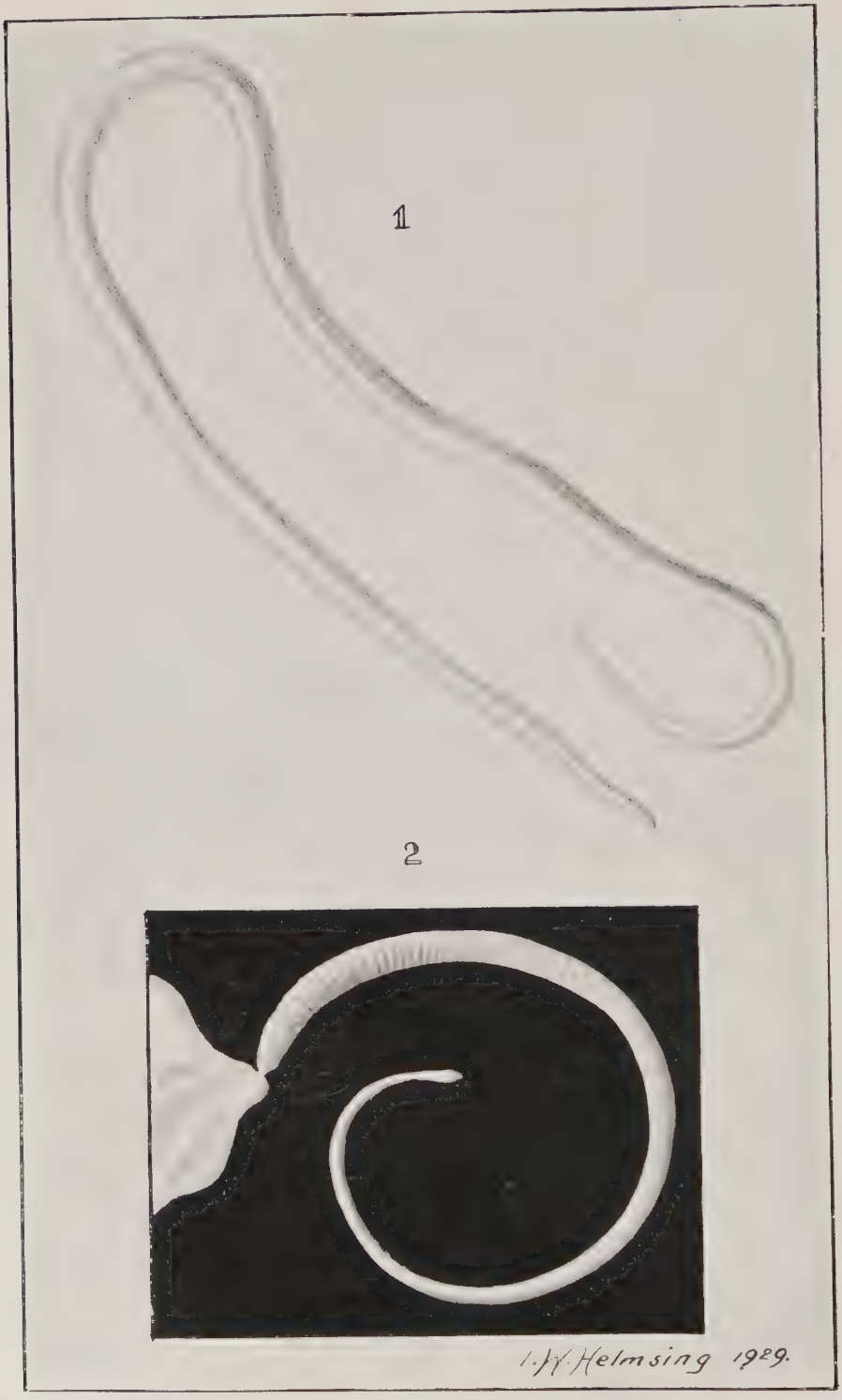


PLATE 88.

Fig. 1.—Long Round White Worm (*Ascaris lumbricoides*), natural size.
Fig. 2.—Thorn-headed Worm (*Macracanthorthynchus hirudinaceus*), natural size.

The Thorn-headed Worm.

(See Plate 88, fig. 2.)

This is also an intestinal worm usually found in the small intestines of pigs. Sometimes it is also found in the large intestines. It is quite frequently found associated with round worms, but usually, in Queensland, only a few thorn-headed worms are found in infested animals. They are a round worm, but are more slender and usually shorter than the Ascaris, and are milky white in colour.

These worms have a powerful armed proboscis with which they fasten themselves to the intestines. They do not suck the blood, but take their food directly from the intestinal contents.

The female lays her eggs in the intestinal tract where they become mixed with the contents and are then passed out with the fæces. These eggs are too small to be seen with the naked eye. The next stage in their life history is when they are swallowed by a species of beetle or its larvæ frequenting the manure of the animal. A few days following this, these eggs hatch out in the digestive tract of the insect and then find their way to the abdominal cavity. The pig in rooting about finds these insects and eats them. Thus the parasites find their way into the stomach of the pig, where they are released by digestive processes and are soon fully mature. These worms do considerable damage when present in large numbers, for they burrow into the intestinal wall where they produce inflammation, and in some instances have been known to produce abscesses and perforation of the bowels. The worms do not remain attached to one place very long, but move about in the intestinal tract, causing a number of inflammatory areas.

When these worms are present in considerable numbers the animal suffers from general unthriftiness, loses weight, has an irregular appetite, and may be constipated at first, suffering later from diarrhœa. The animal may show signs of nervousness, and the muscles of the head and neck may jerk or twitch; at this stage convulsions may take place, and if so, the animal usually dies.

The only way to deal with these worms is to prevent infestation by keeping the pigs on areas that are not infested with these beetles and their white grubs; these are frequently found in old manure piles and in decaying timber and rubbish. General sanitary measures are strongly recommended. The same treatment is recommended for prevention of long white worms. No worm medicine should be given unless the animal has been fasted for at least eighteen to twenty-four hours; this allows the medicine to work on an empty stomach and in an intestinal tract not overloaded with food. Medicinal treatment is not likely to be as effective in the case of thorn-headed worms as it is where *Ascaris lumbricoides* is present alone.

In addition to the preventive measures referred to above, it is suggested as a further means of preventing infection that sows about to farrow be placed in a clean pen. Young pigs born under these conditions have a better chance of keeping free of infection during their early growth when heavy worm infestation may have fatal results.

The Lung Worms.

The lung worms (*Metastrongylus apri* and *Chaerostrongylus pudendotectus*) are not as common in pigs in this country as abroad, though they are occasionally found and are probably spreading into new districts

every year. They infest the bronchial tubes and air passages which abound in the lungs, and are a source of much irritation and annoyance to the affected pig.

The lung worm is a delicate white or brownish coloured thread-like worm, in length from one and a-quarter to one and a-half inches. The male is slightly shorter than the female, and the headpiece is provided with a sucking apparatus by means of which it is possible for the worm to cling to the mucous membrane. The entire life history of the lung worm is not well known, but it is evident that the eggs are passed out in the mucous discharges from the nostrils and the mouth; they may also be swallowed by way of the mouth and be passed out in the discharges of the bowels. The eggs often find their way into the ground, where, with sufficient warmth and moisture, they hatch out and are taken into the intestines with food, &c., and from there enter a blood vessel, and eventually find their way to the air passages and lungs. Lung worms are responsible for the disease known as verminous bronchitis.

It is not known how long the eggs may remain dormant or how long the newly-hatched worm can live before an opportunity offers for their being carried back to the air passages of a new host. Pigs infested with lung worms will suffer severely if the worms are present in large numbers, but if only a few are present, they may not be noticed. Young pigs are more likely to suffer than mature animals. Affected pigs usually cough very much after rising in the morning or after taking food or exercise. This cough is the result of irritation of the mucous membrane. Unthriftiness and emaciation would follow if the animal were severely infested. There is no reliable method of treatment, as the pig is not an easy patient when it comes to fumigation by inhalation, hence preventive measures with careful housing and feeding must be relied upon in the battle against lung worms.

Overseas Experience.

In an interesting report on "Some Parasitic Diseases of the Pig," by Professor Basil Buxton, M.A., F.R.C.V.S., in the Pig Breeders' Annual, emphasis is laid on the economic importance of diseases of the pig. Professor Buxton also makes an excellent point when he refers to the drastic measures that are adopted by Government officials in Great Britain, in the case of an unfortunate outbreak of Swine Fever or Swine Erysipelas, while little attention is paid to the more insidious, although equally important, broncho or gastro intestinal parasites.

He adds that the common "Lung Worm" of the pig (*Strongylus paradoxus*, sometimes also referred to there as *Metastrongylus apri*), is responsible in some districts for serious losses among young pigs. The irritation caused by these parasites results in bronchitis and later in pneumonia. The lung worms are whitish or brownish white threadlike parasites, varying in length from one to one and a-half inches. The eggs contain active embryos and these probably hatch in the lungs, and are carried out in the mucus discharged by coughing or may be voided directly or be swallowed and passed out with the faeces. Many pigs are doubtless infected through their drinking water.

Treatment for lung worms is a much more serious business than for intestinal worms; hence competent aid should be called in to handle the case and advise as to the best forms of medications.

The Kidney Worm.

(See Plate 89, figs. 1 and 1a.)

Kidney worms, technically referred to as *Stephanurus dentatus*, Dies. are now one of the most persistent parasites of the pig, though, until recent years, they were comparatively rare and in many parts of Australia were unknown, but during the last twenty years they appear to have spread with surprising rapidity and now scarcely a district could be named in which infected pigs could not be found. The worms are quite characteristic and distinct; being mottled in colour, similar to brown or light tortoiseshell, the male growing to about an inch in length, and the female slightly longer.

The kidney worm makes its habitat in the abdominal viscera, especially in the fatty tissues surrounding the kidneys and in the fatty tissues of the intestines, stomach, liver, and other organs where it may cause abscesses varying in size, and in the pus of which the worms may be found singly or in pairs or more. These abscesses are usually soft and spongy and if the worms are plentiful may be extensively distributed.

Individual pigs do not appear to be infested with any great number of parasites. The affected kidney will be much enlarged; there may be a quantity of creamy pus in the pelvis (or internal cavity of the kidney), or this may have developed into an abscess. The worms will invariably be found in the tissue, and in the case of the ureters* they may be found floating in the pus. In the fatty tissue (the flare or kidney fat) the worms may be numerous and can at once be observed by their peculiar (mottled) colour and form.

There is no other worm infesting the pig that could be mistaken for the kidney worm. It is difficult to understand how they reach their favourite haunts, but their life history shows that the female lays eggs that are passed out in the urine and are thus deposited on the pastures where, under favourable conditions of temperature and moisture, they hatch within twenty to thirty-six hours, and within about a week they reach the infective stage, and are ready to start work in susceptible pigs that might swallow them in food or water. In this way they enter the intestines and eventually reach the kidneys or the fatty tissues surrounding these areas. It is apparent that the eggs and larvae are both susceptible to low temperature and drying. Some authorities state that, on hatching, some of the larvæ are taken in with the food and others bore through the skin, the organs affected being dependent upon the method of infection.

When the deep-seated position in which these worms lie is remembered, it will be seen that treatment is a very difficult matter; in fact, it is impossible to rid the animal of them by direct treatment. Ordinarily there is no way during life of determining when an animal is infested, except by microscopic examination of urine, fæces, or infested soil; and if any symptoms were present that would indicate their presence it would be problematical whether treatment would be of any value. Pig breeders should make a point of striving by strict sanitary methods to keep out parasites of all descriptions and to be extremely careful when buying fresh stock to see that they come from clean herds and are

* The ureter is the duct through which the urine flows from the kidney to the bladder. The urethra is the canal or duct through which the urine flows from the bladder.

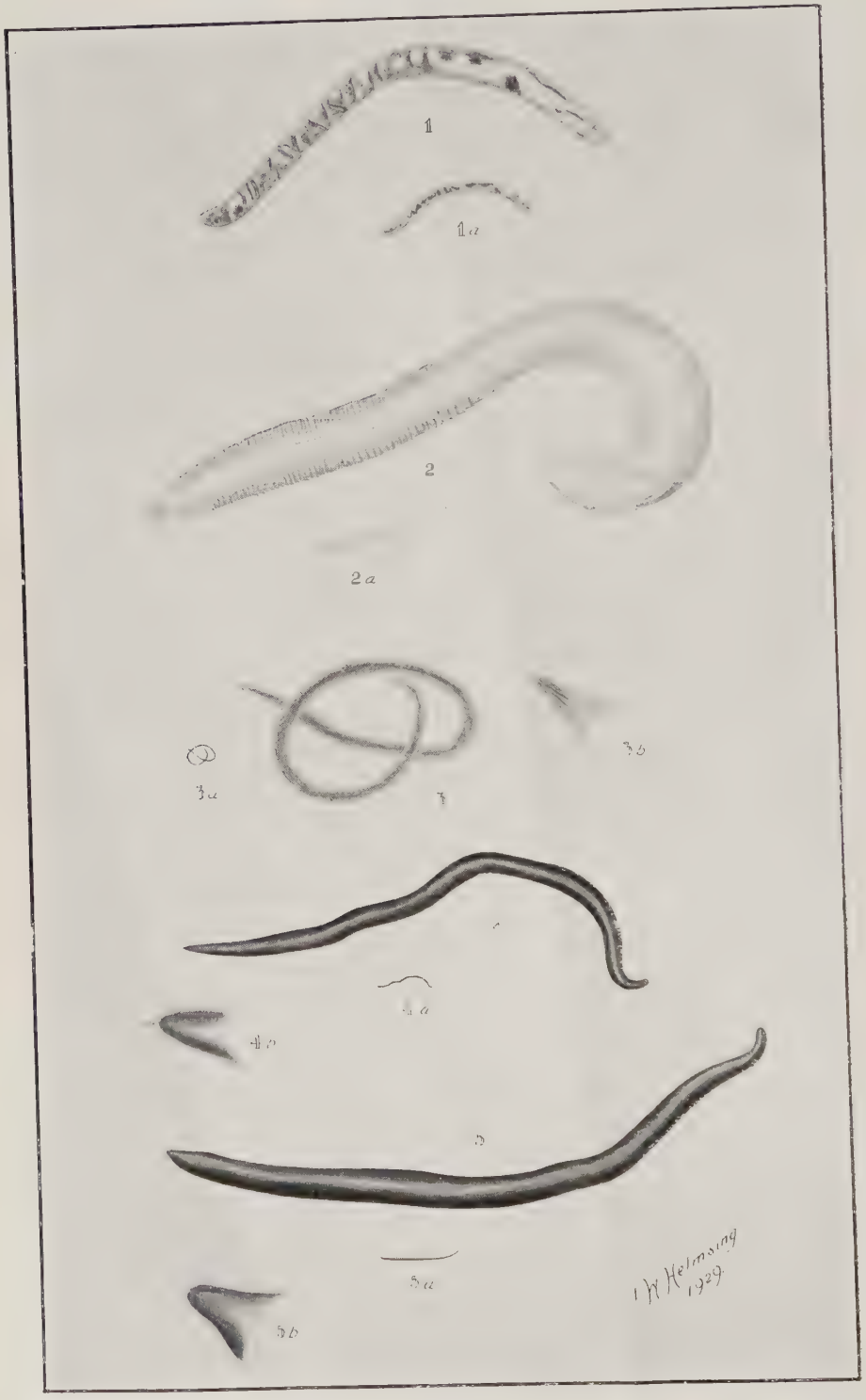


PLATE 89.

isolated from the rest of the pigs for at least three weeks. It must further be remembered that a pig in good condition is better able to resist these parasites than would be the case if poorly fed and attended to.

Kidney worms cause an ever-increasing economic loss in organs or parts thereof condemned, although normal carcasses that are infested are not usually reduced in value, nor are they subject to condemnation by meat inspectors if they are otherwise in marketable condition.

Kidney worms are reputed to be the cause of partial paralysis of the hindquarters of pigs, but this is by no means certain, though a pig infested with kidney worms must suffer a good deal of inconvenience and probably pain, and in this way might be predisposed to conditions responsible for paralysis.

The Whip Worm.

The whip worm (*Trichuris trichiura*) is a tiny, whip-like white worm found in the coecum and colon. In size they vary from one and a-half to two inches. The anterior portion of the body is thin and threadlike and the posterior portion is quite stout. The whip worm buries its long head in the mucosa whilst the heavy body floats freely in the lumen of the large intestine. They feed upon the blood and other nutritious matter absorbed from the spot into which the mouth is buried. The life history is simple, reinfection occurring when the eggs are taken into the stomach. Here they hatch and the young larvae quickly reach the coecum where maturity may be attained in sixteen to twenty days.

This worm is not often found in pigs which are kept in cleanly sanitary surroundings; like the round worm it thrives on farms where there is neglect. The eggs are very resistant and may live for years before losing their vitality. As with the round worm good sanitary conditions are most desirable, as owing to its location, it is very difficult to reach the whip worm with any vermifuge.

Plate 89.

Fig. 1. Kidney Worm, x $2\frac{3}{4}$.

Fig. 1*a*. Kidney Worm, natural size.

Fig. 2. Hook Worm, x 7.

Fig. 2*a*. Hook Worm, natural size.

Fig. 3. *Arduenna strongylina*, x 8.

Fig. 3*a*. *Arduenna strongylina*, natural size.

Fig. 3*b*. *Arduenna strongylina*, anal extremity.

Fig. 4. *Necator americanus*, x 8.

Fig. 4*a*. *Necator americanus*, natural size.

Fig. 4*b*. *Necator americanus*, anal extremity.

Fig. 5. *Ancylostoma duodenale*, x 8.

Fig. 5*a*. *Ancylostoma duodenale*, natural size.

Fig. 5*b*. *Ancylostoma duodenale*, anal extremity.

ADDITIONAL INTESTINAL PARASITES OF PIGS.

Ancylostoma duodenale Dub. (hookworm). Pl. 89, figs. 4, 4a, and 4b.
Necator americanus Stiles (hookworm). Pl. 89, figs. 5, 5a, and 5b.
Oesophagostomum longicaudum Goodey (nodule worm).
Oesophagostomum dentatum Rud. (nodule worm).

The first and second are the common hookworms of man which were recorded for the first time in Australia by Doctor John Legg, B.V.Sc., M.R.C.V.S., Government Veterinary Surgeon, Townsville, and Mr. J. Rheuben, Slaughtering Inspector, Department of Agriculture and Stock. A further description of these worms with photos will be found in "Neuman's Parasites," second edition, available at leading booksellers.

Hookworm attach themselves to the duodenum of the pig (portion of the intestines) in thousands, and that portion of the bowel being rich in blood vessels it will readily be seen how infestation results in an animal becoming emaciated as these worms feed on the blood. It is not known at present to what extent these parasites infest Australian pigs, for they have not been reported on extensively. Likewise, it is not known whether their presence in pigs results in any serious disorders apart from the condition already described. Doubtless, more will be heard of them in the future as extended research makes it possible to locate more the species. These worms have also been reported on by Dr. Georgina Sweet, Melbourne, Victoria, a noted authority on Animal Parasites.

The two species of *Oesophagostomum* inhabit almost exclusively the large intestine giving rise to the condition, more familiar to sheepmen and caused by a somewhat similar worm in sheep, known as pimply gut. The nodule worm of swine is a small white or grey worm, varying from half an inch to an inch in length, the female being the larger. Fortunately these worms are comparatively rare, and when infestation is light may do no damage to the older animals. In young stock the nodule worm is suspected as being responsible for intestinal irritation, unthriftiness and anaemia, and is also believed to be a contributing factor to peritonitis.

The life history is direct, the eggs being passed out with the faeces. Here they hatch and feed on the foecal matter for a short while and gradually grow into the infective stage. This stage is taken in by the pig with food or water eventually reaching the large intestine.

Treatment is difficult and is mainly concerned with prevention, by keeping the pigs under sanitary conditions.

Stomach Worms.

Of the four stomach worms recorded, *Arduenna strongylina* (Pl. 89, figs. 3, 3a, and 3b) and *Physocephalus sexalatus* appear the most important. These are small whitish to reddish worms usually found together and occupying the pyloric region of the stomach and upper small intestine. In size they may vary from three-fifths to seven-eighths of an inch. Pigs heavily infested with these worms will give evidence of thirst, restlessness and do not feed well. These parasites have a life history somewhat similar to the thorn-headed worms—various beetles playing the part of intermediate host, the pig being reinfested by eating these insects.

One American writer (Kingsley) states that *Arduenna strongylina* is a very common parasite in the stomach of swine. It is possible that at least 90 per cent. of swine are infested with these parasites. He also states that the *Simondsia paradoxa* infests the stomach of swine, but is probably not common in the United States of America, although quite prevalent in some sections of Europe.

Gnathostoma hispidum (Pl. 89, figs. 2 and 2a) has been recorded once only, from far Northern Australia.

Bladder Worms.

These are the larvae of various tapeworms which in the adult stage inhabit other animals. The most common bladder worm found in pigs is called *Echinococcus granulosus*, better known as hydatids. The adult of this tape worm lives in the dog. *Cysticercus tenuicollis* is more familiar to the sheepman. The so-called water-ball as known to slaughtermen being this larva. The adult, *Taenia hydatigena*, also lives in the dog. Hydatid cysts are usually found in the liver and lungs, whilst *Cysticercus tenuicollis* inhabits the omenta and mesenteries. Treatment in these cases consists in preventing pigs from eating the fæces of dogs, for in the fæces the eggs of the adults are to be found. Similarly dogs should not be given pig offal, as this would allow the ingestion of these larvae which would eventually reach the adult stage in the dog and become a further source of infection.

Cysticercus cellulosae, the cause of pig measles has not yet been recorded in Australia. The adult of this bladder worm is known as *Taenia solium*, and its host is man. Infection of the pig occurs through allowing these animals access to human fæcal matter.

In pickling hams and pork and using a pickle pump to inject the thicker portions of the meat, it sometimes happens that gas or gas-forming bacteria are introduced which produce in the hams or bacon a peculiar bladder-like condition in the tissues (fatty) between the muscles and also in the connective tissue, and these at first sight resemble in appearance measly pork, but a careful examination will reveal the true condition.

Fasciola hepatica L. is most usually found in sheep, but has been recorded from both cattle and pigs. Although in New South Wales it is very prevalent among sheep in certain districts it has not been reported in any numbers from Queensland. The pig may be termed an accidental host, and in this State there is only one record of this animal acting as a host.

PREPARATION OF SPECIMENS FOR VETERINARY OR BACTERIOLOGICAL EXAMINATION.

If it is desired to forward to the Department of Agriculture and Stock specimens of diseased organs or parts, plants or seeds suspected of being poisonous, &c., for examination, it would be well to observe that by attention to the following instructions specimens for examination should arrive safely for investigation:—

Every specimen should have attached to it a label clearly written or printed indicating the sender's name and full postal address, the nature of the specimen submitted and from what animal or source obtained.

Small morbid specimens, including tumours, suspected tubercular growths and internal organs, should be forwarded in a sealed bottle, and preserved with either of the following:—

One part of commercial formalin to four parts of rain water.

Equal parts of methylated spirit and rain water.

Neither the methylated spirit nor the ordinary salt solution are as satisfactory as the formalin; the latter may be purchased at chemist shops at a very nominal cost.

The bottle should be well wrapped with plenty of old cloth or rags, packed securely in a tin container and sent by rail.

Large specimens are best surrounded with coarse salt, packed in a box, and railed immediately by most rapid route.

Internal parasites (worms) may be preserved in a small bottle containing equal parts of methylated spirit and water or formalin as above stated, and must be carefully packed and be sent by post.

External parasites, such as ticks, lice, &c., should be forwarded in the living condition in a tobacco box, securely packed with plenty of paper wrapping, with address and contents clearly indicated.

Blood Smears for Examination.

In some cases these afford valuable information. All that is required is to smear the merest trace of blood on one side only of a small piece of flat clean glass—thin window glass about 1 inch long and 2 or 3 inches wide. The blood film should be smeared once only and as thin as possible.

In suspected lung trouble the whole suspected lung, packed in formalin solution, should be forwarded.

There are usually no charges for examination of specimens but detailed advice *re* this could be obtained on application.

Specimen of grasses, &c., may be forwarded in a partially dried form; the specimen to include root, stem, leaves, flower or seed. If specimens are forwarded wrapped in blotting paper (clean) it would prevent development of mould. Seeds may be forwarded in any suitable container and should be packed in clean cotton wool.

In all cases forward to the Under Secretary, Department of Agriculture and Stock, Brisbane, advising by letter, 'phone or wire in ample time beforehand, so that arrangements may be made for examination prior to receipt of specimens.

AN INTERESTING JOURNAL.

A Mudgeeraba farmer, in appreciation of valuable assistance received from the Department of Agriculture and Stock, and also of the usefulness of this journal, writes (11*th August*, 1930): "*. . . I might say that the 'Queensland Agricultura' Journal' is the most interesting paper a farmer could have . . .*"

TOMATO CULTURE.

By Officers of the Fruit Branch, Department of Agriculture and Stock.

In recent years the production of tomatoes has materially increased, but taken as a whole it is doubtful whether the increase is proportionate to the larger area under this crop. Various factors have operated against the continuance of high yield, of which constant cropping of the same land is not the least important. The lack of efficient soil treatment, the introduction and establishment of disease in addition to such as may have already been established, and frequently insufficient attention all militate against high averages. It must also be admitted that the land cropped is not always of a nature best suited for tomato culture. These matters and points on grading and packing are discussed in these notes.—Ed.

SOIL REQUIREMENTS.

A FINE alluvial loam with good fertility and efficient drainage is considered the most suitable, though excellent crops are also obtained from basaltic soils. Continuous cropping of the same land is not in any circumstances recommended; in fact, alternate sowing with green crops to plough into and maintain the supply of humus in the soil are necessary and will, in addition to maintaining the desired element in the soil, assist in retaining such fertilisers as are applied. Whatever green crops are used, the choice of variety depends upon local conditions. It should not be subject to eelworm or nematodes; therefore cow pea could not be recommended.

Maize sown broadcast and fairly closely provides a liberal supply of vegetable matter and is now receiving more general attention in this line. It will be found advantageous to apply the necessary fertiliser before planting the green crops so that a luxurious growth may be ensured; the fertilising elements which have been absorbed by it will be returned to the soil when it is ploughed under.

Ground that becomes sodden in wet weather becomes rapidly hard and dry after rain. Where a small plot, generally referred to as a soak, exists it may, according to the situation, be worth while draining it with agricultural pipes, but draining large areas is not profitable.

Good preliminary cultivation is most essential. Land which has not been under cultivation previously or is deficient in any or all of the plant foods should be liberally fertilised. Unfortunately, farmyard or stable manure is rarely available in sufficient quantity (its deficiency is responsible for much ploughing under of cover crops to provide the necessary mould); consequently other fertilising material must be applied, and the following formula is recommended:—1 to 1½ cwt. sulphate of ammonia, 5 cwt. of superphosphate and 1½ to 2 cwt. of muriate (or sulphate) of potash per acre. These should be thoroughly mixed, spread evenly over the soil, worked into, and thoroughly incorporated with it.

Planting.

Planting is usually done in rows and the plants subsequently allowed to grow at will, practically covering the soil surface. Staking with or without wiring is seldom practised, the extra labour not being considered warranted, but this is open to question, particularly where the available land is limited. The distance between plants ordinarily varies according to soil and local conditions from 4 feet to 8 feet, or even more according to local conditions. Where grown with the aid of stakes (with or without wires) they may be planted 18 inches to 2 feet apart, and 3 feet between the rows. The plants are trained to a single stem from the outset, all laterals being removed close to the stem without injuring the main foliage and the terminal bud removed when the height of the support has been reached, the plant being trained vertically; all parts are accessible to applications against fungi or insect pests. Where stakes are plentiful and light, one to each plant is used, 4 feet to 5 feet being allowed above the ground level, the plants being tied to them in three or four places before reaching the top. By the use of fairly heavy posts sunk well into the ground at distances of about 30 feet apart wire may be used. These may be kept in position by "droppers" reaching a short distance into the soil. The advantages of this system are that clean cultivation can be much more readily

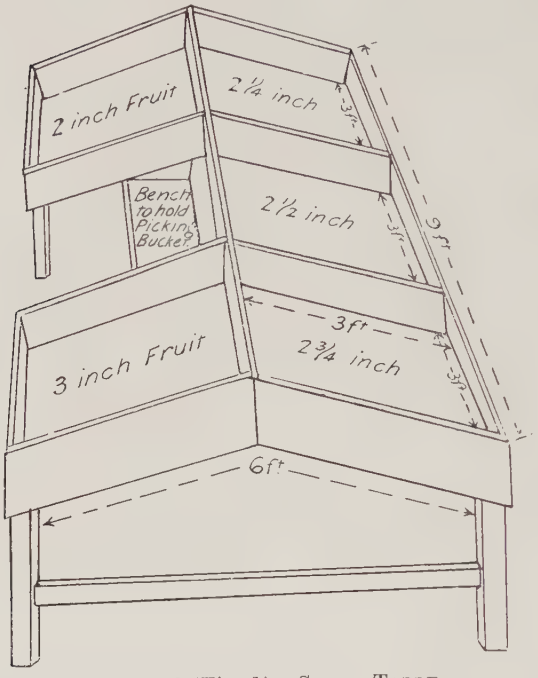


PLATE 90 (Fig. 1).—SIZING TABLE.

Diagram of sizing table containing bins for five sizes of tomatoes, and a space with bench built in to accommodate sizing hand.

Note.—This table should not be made too big, as this will cause rough handling of fruit.

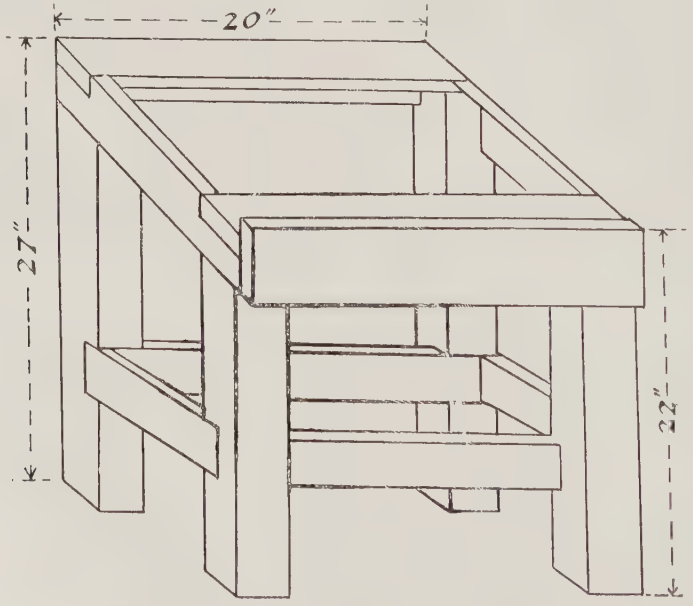


PLATE 91 (Fig. 2).—PACKING BENCH.

Diagram of a useful packing stand—height in front, 22 inches; height at back, 27 inches; distance from front to the back, 18 inches; legs, 3 inches x 3 inches; stays, 3 inches x 1 inch; front board, 5 inches x 1 inch. This stand should be made wide enough to hold two cases, thus permitting two counts to be packed at the same time from the sizing table.

practised; moisture is retained by lightly working the surface soil, and where necessary attention is given, practically no losses from blight nor caterpillar, also very much increased yields, in some instances over 100 per cent. are recorded.

Varieties.

As to varieties, preferences differ in every district, and no list of suitable varieties for all districts can be submitted. This is particularly instanced in the wilt-resistant properties claimed for Bowen Buckeye in the district of its origin, while under trial with a collection of other kinds a Hawkesbury proved to be the most susceptible to the disease. Growers have been advised repeatedly to save their own seeds from selected plants showing a combination of vigour, productivity, and even-shaped fruit of medium size. Excessively large fruit is generally prone to irregularity in shape, is seldom so freely produced, and for general purposes is not so much in demand as fruit of medium size. It is disappointing to note how few have accepted this advice, and it is a common practice to purchase imported seeds and to a lesser extent import seed direct from oversea. To lack of discrimination in this respect, the wide distribution of the ills which beset the plants are in a great measure responsible. As the tomato thrives so vigorously in this State it is reasonable to assume that an all round improvement could be effected by selection, for it will be noted that odd plants in a plot show marked advantages over others in their vicinity.

Much has been said in favour of the wilt-resistant varieties, among which Norton has not been superseded. Such varieties are, however, not so widely sown as one would expect, and the inference is that they are not considered as profitable as those for which no such claims are made.

Raising the Plants.

Diversity of opinion exists as to the advantages of planting the seeds in the position where the plants are to remain. The practice may present disadvantages in districts of light rainfall, but under ordinary conditions it has a most important feature to commend it. In transplanting no matter how careful the operation, many roots are broken and where such breakages occur an opening is made for the entry of injurious bacteria. Where seed-beds must be provided the same site should not be used for two seasons in succession.

Shade is sometimes necessary to secure even germination, and this can be obtained by the use of straw or even bags laid upon the ground in which the seed is planted, the covering being removed as soon as the young plants begin to appear through the soil. Before planting the seed the soil should be reduced to a fine tilth. That is important. Following planting the soil should be firmed either by beating with the back of a spade or shovel or completely treading it. A fine light layer of loose soil should then be scattered over the surface. In the absence of firming, the soil will frequently dry to a sufficient depth to prevent germination, even when watered daily.

Plants grown close together as seedlings in the seed-bed usually draw freely on the available moisture, and if this is not present make poor growth. An even and adequate supply of moisture is therefore necessary to develop robust plants, but for a day or two prior to transplanting (unless it should be during showery weather) watering should be entirely suspended.

In the field the land should be well prepared; deep working will assist the plants to withstand dry weather, and cultivation while it can be practised (throughout where staking is employed) will also materially help.

It is, unfortunately, a rather common sight to see rejected fruit scattered over the field where it decays, and in the process provides a medium for the development and spread of diseases and pests. Instead of the old stalks, and as far as possible the foliage, being collected and burned as soon as the plants become unprofitable they are left until some later date and then more or less ploughed into the soil.

MARKETING TOMATOES.

Much has been written on the subject of marketing different fruits, but the essential facts are still the same; grading, sizing, packing, and an attractive get-up to the finished package are the things that count. The grower must study the needs of the consumer, retailer, and agent to get the best price for his product.

Consumers want tomatoes of good quality and in a condition that will induce them to buy more, so increasing the demand and disposing of greater quantities. Immature, small, or grubby fruit are not appreciated, and many of the householders getting fruit of this description from the retailer cease to buy tomatoes for a week or so, thus causing an over-supplied market, with the consequent drop in prices.

PLATE 92 (Fig. 3).

Four specimens of tomatoes photographed on edge and on the flat, showing the uneven layer which would be obtained with tomatoes packed on the flat, and the even layer obtained by placing the fruit on its cheek as is done when using the Standard Cheek Pack.

These were four tomatoes taken from a case in the market measuring $2\frac{5}{8}$ inches in diameter.

Retailers require tomatoes of a uniform quality to enable them to sell, if possible, 100 per cent. of good, sound, unblemished fruit, thus satisfying their customers and keeping up a demand.

Growers should remember that a good agent to handle their fruit is necessary, but the more important thing is to give a good agent good fruit to handle. Once the market receives bad fruit the demand ceases, prices drop, and agents then have difficulty in getting payable returns for the grower. Buyers will pick out the best packed and graded fruit, causing the grower of badly graded and packed lines to lose on his consignment. The advantages of good packing and grading are very pronounced on a slow market.

Grading.

With tomatoes, grading usually is the worst carried out operation, growers as a rule mixing all sizes and colours. We know that at the start of a season, owing to the small quantities of fruit ready to harvest, it is hard to separate all grades into separate cases, but this is an easy matter when the season is in full swing. Retail buyers and agents want fruit packed true to size and colour; fruit of a uniform size being either all green matured fruit fit for country orders or ripe fruit suitable for city and suburban trade. Growers in remote districts may possibly find difficulties in landing their tomatoes in perfect condition as regards colour on distant markets, but big improvements can be made by these growers. One sees in the markets fruit from distant districts almost totally green throughout the case, but having ,perhaps, a dozen to twenty ripe or nearly ripe fruits in the case. A case of this description of pack is of no use to any buyer. If bought for country trade, the ripe fruit would be found running out of the box on arrival at its destination, and not being ripe throughout the case it is of no use for a city or suburban buyer. Some growers reverse this practice by having ripe tomatoes with a few green specimens included. Another bad fault is the packing of immature tomatoes. Many growers in trying to catch early markets pick before the fruit is mature, so giving it no chance to even ripen properly. The public, through buying immature fruit at the start of the season when prices are high, is turned against tomatoes with the consequent causing of the marketing troubles mentioned previously. Any immature fruit that may be picked by accident should be rejected when packing. Diseased, blemished, and cracked fruit should not be included; one or two specimens of this description lowers the value of the whole case.

Sizing.

For the successful packing of tomatoes sizing is absolutely necessary, and must be done before proceeding to pack. It is possible with citrus, apples, or pears to pack without sizing first, but with tomatoes it is essential to size first. At present we do not know of any sizer that is a complete success for sizing tomatoes, but the revolving roller and moving belt type of appliance is a big help. The best method for the grower with a small acreage is a sizing table, a diagram of which is shown (Fig. 1). This can easily be made at home. It is necessary to have the centre raised to allow the fruit to run to the edges of the table where the packers are working. This saves reaching for fruit. Packing operations are conducted from the sides of the bins or compartments of the table. To save throwing or rough handling on the part of the operator sizing the fruit, it is advisable not to make the table too big. Benches 3 feet by 3 feet are a good size; this would mean a table 9 feet long by 6 feet wide. There are five compartments for sizing, the space in the middle at one side being used by the sizer to stand in whilst sizing. A bench for standing the packing bucket on is a great convenience and time saver—allowing the sizer to use both hands for operations. Best results will be obtained where it is possible always to have the sizing done by the same person, who will soon become very fast and expert.

A packing stand to hold two cases can also be easily made (Fig. 2). Packers are advised to pick two sizes together from each bin.

Packing.

Many and varied are the ways one sees the operation of packing carried out. Flat packs, solid packs, and square packs all have their supporters, but the standard cheek pack with its pocket system has all the advantages; easy to learn and easy to do when following on the sizing operation, and all sizes will pack correctly. The most popular box for marketing tomatoes is the dump half bushel 18 inches by 8⅝ inches by 7⅛ inches, but some growers use the half long-bushel case with a partition 26 inches

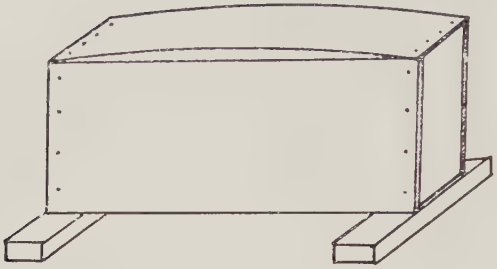


PLATE 93 (Fig. 4).—NAILING DOWN.

Method of placing two pieces of timber on the floor of shed. This makes a good solid nailing down bench, and permits the bottom of the case as well as the top to bulge slightly when the lid is nailed on.

PLATE 94 (Fig. 5).

The method of obtaining the layer count is by counting two alternate lines of fruit from end to end of the case.

by 6 inches by 7⅛ inches. The advantages of the dump half bushel are as follows:—Easier and quicker to make up through having no partition, a better shape for handling, stacking, and carting, and, being wider, easier to pack into—allowing a packer more room to work with greater speed. Its shape also lends itself to displaying fruit to better advantage. Some packers make the dump half bushel case the narrow way 18 inches long by 7⅛ inches wide by 8⅜ inches deep (Figs. 11 and 12), but making it the broad way 18 inches long by 8⅜ inches wide by 7⅛ inches deep is to be preferred—allowing more room to work in, and giving fewer packs and counts (see packing tables), with greater ease in sizing. It also has fewer sizes that give trouble to the beginner in getting fruit up to the correct height in the case. The best plan is, where possible, to pack the tomatoes over-night, nailing them down and despatching the next day.

By studying the illustration (Fig. 3) of the four specimens of tomatoes shown on their cheek and on the flat there will be seen one of the great reasons why we use the cheek pack in preference to the flat pack. By placing fruit of a given diameter, which is the system of sizing used commercially, we get an even, level layer, but by placing fruit on the flat we get uneven layers to pack on, which greatly increases our difficulties in bringing the case up to an even face for lidding or for display purposes. It would also be impossible to have standard packs and counts if using any system but the standard diagonal cheek pack. Once a type of tomato of a given diameter is packed correctly the same type and size will always pack correctly and give the same count by using the same pack.

PACKS THAT WILL BRING TOMATOES TO THE CORRECT HEIGHT IN THE DUMP HALF-BUSHEL CASE.

In cases made on the wide system (Fig. 8), 18 in. long, 8⅜ in. wide, 7⅛ in. deep.					In cases made on the narrow system (Figs. 11 and 12), 18 in. long, 7⅛ in. wide, 8⅜ in. deep.				
Size.	Pack.	Layer Count.	Number of Layers.	Total.	Size.	Pack.	Layer Count.	Number of Layers.	Total.
	3–2	9–9	4	180		3–2	8–7	6	225
	3–2	9–8	4	170		3–2	7–7	6	210*
2¼	3–2	8–8	4	160		3–2	7–6	6	195*
	3–2	8–7	4	150		2–2	9–9	5	180
2½	3–2	7–7	4	140		2–2	9–8	5	170
	3–2	7–6	4	130	2¼	2–2	8–8	5	160
	2–2	7–7	4	112*		2–2	8–7	5	150
	2–2	7–6	4	104*	2½	2–2	7–7	5	140
2¾	2–2	6–6	4	96*		2–2	7–6	5	130*
2¾	2–2	8–8	3	96		2–2	6–6	5	120*
	2–2	8–7	3	90		2–2	6–5	5	110*
	2–2	7–7	3	84	2¾	2–1	9–8	4	102
3	2–2	7–6	3	78		2–1	8–8	4	96
	2–2	6–6	3	72		2–1	8–7	4	90
	2–1	8–7	3	68		2–1	7–7	4	84
3¼	2–1	7–7	3	63*	3	2–1	7–6	4	78
						2–1	6–6	4	72
					3¼	2–1	6–5	4	66*
						2–1	5–5	4	60*
						2–1	6–5	3	50

* Denotes open packs.

Nailing down is best carried out by placing two battens lengthways on the floor so that the ends of the case will rest on them, allowing the bottom to bulge slightly when the lid is nailed on (Fig. 4).

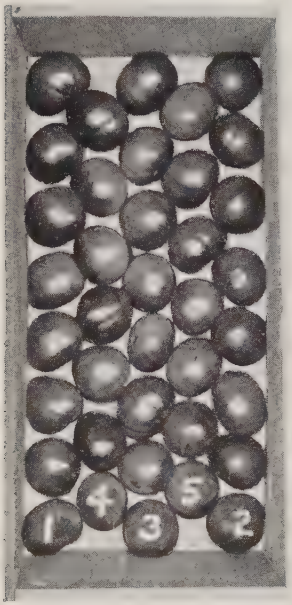
The chief points of the standard pack are as follows. Memorising these will assist the beginner a great deal:—

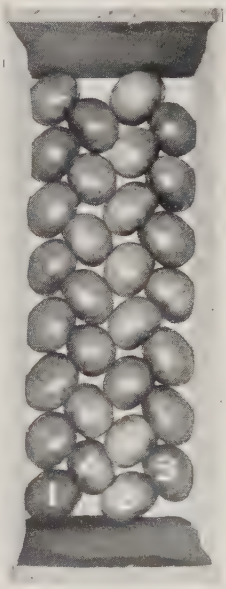
1. All fruit to be placed on edge, that is, on its cheek;
2. Use three packs: 3—2, 2—2, and 2—1 (Fig. 6).
3. Two fruits must not rest directly one on top of the other but in the pockets formed by the spaces between the fruit of the previous layer (Fig. 7).

3—2 pack, 8 x 7 layer, 4 layers in the case, total 150. The layer count is obtained by counting from end to end two side by side lines of fruit in the case. (*See* Fig. 5)

2—2 pack, 7 x 6 layer, 3 layers in the case, total 78. The layer count is obtained by counting from end to end two side by side lines of fruit in the layer. (*See* Fig. 5.)

2—1 pack, 8 x 7 layer, 3 layers in the case, total 68. The layer count is obtained by counting from end to end the side by side lines of fruit in the layer. (*See* Fig. 5.)





First layer 3—2 pack. The pack gets its name from the first layer being started with three placed against the end of the case and then two being placed in the pockets formed by the three. his is repeated until the layer is full.

First layer 2—2 pack. The pack gets its name from the first layer being started with two placed against the end of the case and then two being placed in the pockets formed by the two. This is repeated until the layer is full.

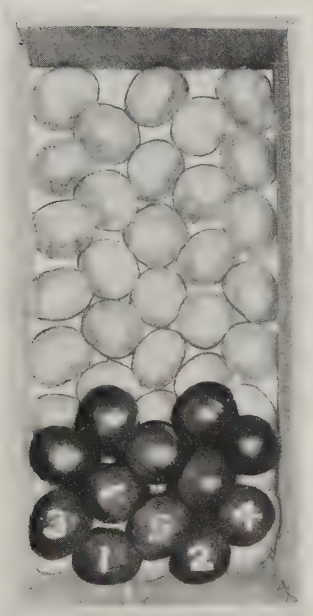
First layer 2—1 pack. The pack gets its name from the first layer being started with two placed against the end of the case and then one being placed in the pocket so formed This is repeated until the layer is full.

PLATE 95 (Fig. 6).—FIRST LAYERS OF THE 3—2, 2—2, AND 2—1 PACKS.
Note the order and position of placing each fruit.

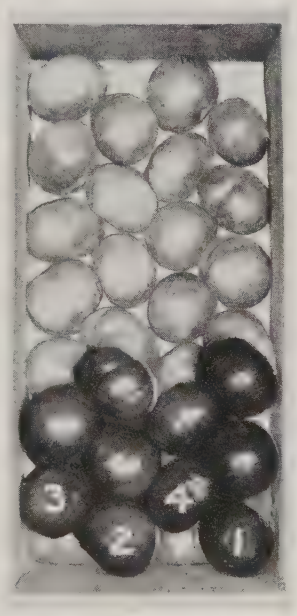
4. The height of the fruit in the case is governed by the size of the pockets in each layer (Figs. 9 and 10).

5. Correctly packed fruit is always placed in straight lines from end to end, across and diagonally in the case (Fig. 8), the fruit always being in alignment.

The illustrations show the method of carrying out the rules of packing, and also show the method of placing the fruit and arriving at the name of pack and layer count mentioned in the table of packing counts (see Fig. 5). Reference to the packing count table will give the beginner an idea of the pack to use for each size. Packing counts are given for the dump half case made both ways and for



Second layer 3—2 pack. This layer starts with two tomatoes resting in the pockets of the first layer, which started with three tomatoes.



Second layer 2 —2 pack. This layer starts with two tomatoes resting in the pockets of the first layer, which started with two tomatoes.

Second layer 2—1 pack. This layer starts with one tomato resting in the pocket of the first layer, which started with two tomatoes.

Plate 96 (Fig. 7).—Method of Placing Fruit in Pack.

Note how the tomatoes rest in the pockets of the previous layer.

the long half-bushel case. A handy sizing gauge can be made by cutting holes 2 inches, 2¼ inches, 2½ inches, 2¾ inches, 3 inches, and 3¼ inches in diameter in a piece of plywood. A 2¼-inch fruit is one that will drop through a 2½-inch ring but not through a 2¼-inch ring; 2½-inch is fruit that will not go through a 2½-inch ring but will drop through a 2¾-inch ring. The same method of measuring applies to the other sizes. It is necessary to make a good start in packing the case correctly, and great care should be taken to see that a good snug, firm, first layer with all fruit in alignment is packed. By placing the correct sized fruit in the pockets of the first and each successive layer the packer will soon learn to pack correctly. By studying the illustrations of the start of the second layer packers will see how the second layer fits in the pockets of the first layer. The third layer is the same as the first, being placed in the pockets of the second layer. It is advisable not to try to pack too fast when first learning. Pace is acquired with practice.

That the height of the fruit is governed by the size of the pockets in each layer, is the most important rule in packing to remember. The counts marked with an asterisk (*) are the counts that are likely to give trouble. As an example, we will take the 2½-inch tomato, 2—2 pack, 7—6 count, with 104 tomatoes. Most packers would try to pack this 2—2 with closed pockets 8—8 count with three layers containing 96 tomatoes, which would come low (Fig. 9), but by opening the pockets and getting a 2—2 pack, 7—6 count, and four layers containing 104 tomatoes (Fig. 10) the case is brought to the correct height without any trouble. The difference in the two cases is: Incorrect count 3 layers of 32, total 96; correct count, 4 layers each containing 26, or 8 more tomatoes to the case. This pocket system can be worked with all types of fruit, and the packer who masters it is soon expert in packing. Study the packing counts and see the packs that have to be packed with the open pockets, these being the only counts that may present difficulties to the beginner.

Noticing the correct alignment of fruit when packing is a guide to the packer, faults being easily detected by observing the pack getting out of alignment. When this occurs the packer should correct the fault immediately by removing the incorrectly sized fruit.

Mistakes must be corrected as they occur, because it is impossible to finish a case perfectly if any one layer is wrong. Packing a layer with fruit too small and placing in two extra is the most common fault found with beginners. When finishing off a case packed with open pockets many packers place two extra small tomatoes in the pockets at the end of the top layer, making it hard to get the lid on and spoiling the alignment of the whole case. A case only holds a certain quantity, and placing more in the case only causes bruising or splitting.

It will always be wise to remember the following points in marketing:—

Good packing alone will not keep up a demand for bad fruit. Good fruit is always necessary, and good fruit well packed and attractively got up is easy to sell and will, in times of over-supply, be the first to be disposed of.

Some growers wrap their tomatoes, but the use of lining paper only is really all that is necessary. It improves the appearance of the finished case to use plain or coloured paper for lining in preference to the use of newspaper, which looks shoddy and shabby, favoured by some of the growers. A coloured label also adds distinction to the packed case, and is recommended. Good packing and get-up followed by careful handling and loading whilst in transit to the market will give the grower the best returns for his labour. Using a packed case as a seat while carting is a very common fault with growers and carters, as is also the walking on cases while stacking in trucks. Want of thought is the reason as a rule why fruit is badly handled in these ways.

Acknowledgment.

Thanks are due to Mr. P. Bach, Pinklands, Mr. A. F. Smith, and Mr. W. Burns, Thornlands, and Arkell and Sons, Fruit Exchange, Brisbane, for making available fruit for illustrations.

Main Points to Remember.

In conclusion, the following are the main points for packers and others who handle fruit to remember:—

Don't place green and ripe fruit in the one case.

Don't place one fruit directly on top of another when packing, but keep them in the pockets of the preceding layer.

Don't stand, walk, or sit upon packed cases.

Don't pack immature green tomatoes; they will not ripen properly.

Don't pack defaced, marked, or damaged tomatoes; they reduce the value of the case.

Don't use newspaper for lining; plain paper pays.

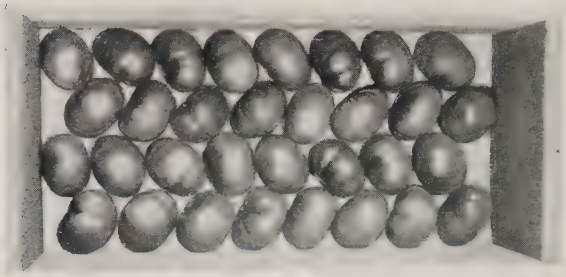
Don't try and pack large and small tomatoes in the one case; it spoils the alignment and the appearance of the pack and helps to reduce the price of the case.

Finished case, 3—2 pack.

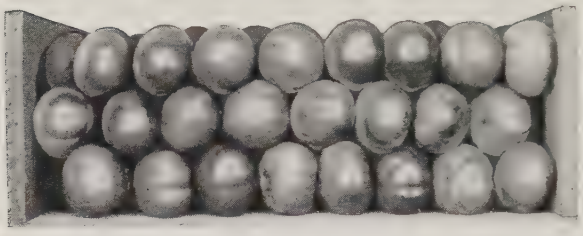
Finished case, 2—2 pack.

Finished case, 2—1 pack.

PLATE 97 (Fig. 8).—ALIGNMENT OF FRUIT IN THE CASE.



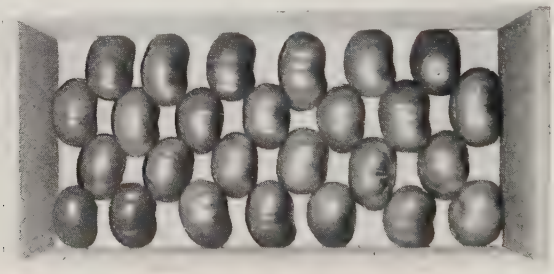
First layer.



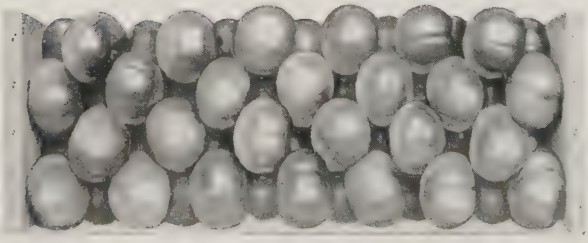
Finished case not high enough.

PLATE 98 (Fig. 9).

$2\frac{1}{2}$-inch tomatoes packed 2—2 with closed pockets, 8 x 8 count, 3 layers, 96 tomatoes, which is too low, but when packed with open pockets, as in Fig. 10, comes to the correct height.



First layer.

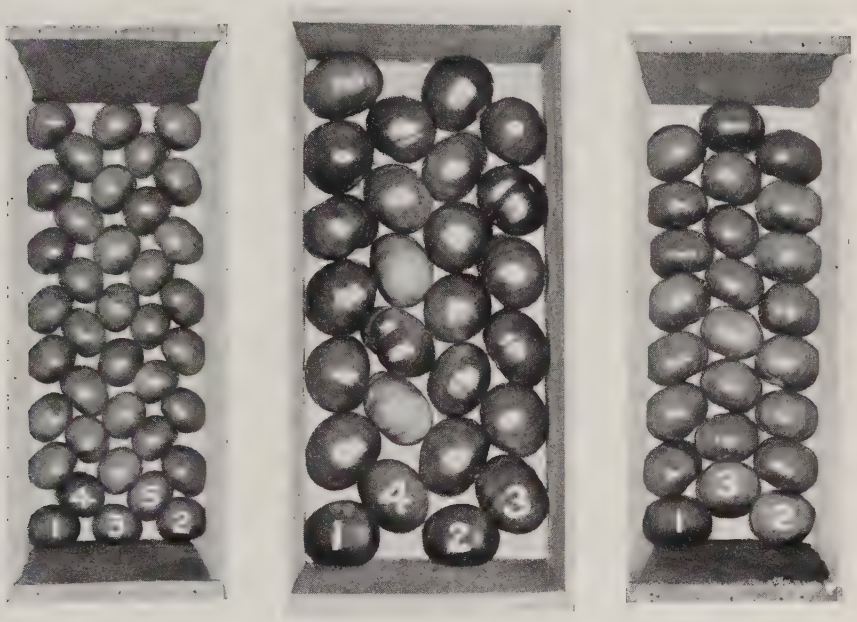


Finished case.

PLATE 99 (Fig. 10).—THE SAME FRUIT AS IN FIG. 9.

Packed 2—2, with open pockets, 7 x 6 count, 4 layers, 104 tomatoes, which comes to the correct height.

These illustrations explain the rule—"The size of the pocket governs the height of the fruit in the case."



3—2 pack. 8 x 7 count, 6 layers, total 225. 2—2 pack. 6 x 7 count, 5 layers, total 150. 2—1 pack. 8 x 8 count, 4 layers, total 96.

Plate 100 (Fig. 11).—First Layers Packed in Cases made on the Narrow System.

Plate 101 (Fig. 12).—Finished Packs in Cases made on the Narrow System—18 in. long, $7\frac{1}{8}$ in. wide, $8\frac{2}{3}$ in. deep.

POULTRY FEEDING TEST.

THE rapid development of the poultry industry and the resulting increased demand for the more popular poultry foods suggested the need of a feeding test to decide their relative values. Accordingly, a test was commenced on the 1st May, 1929, at Mount Gravatt, by officers of the Department of Agriculture and Stock, with the object of making a comparison with wheat and wheat by-products on the one hand and maize and maizemeal on the other; and, as barley can be secured at reasonable prices at times, it was considered desirable to utilise this grain in a test also. It was hoped to serve a double purpose in so far as that individual records of production might be obtained per bird as well as the determination of the suitability of various foods for egg production.

The test commenced with 288 birds belonging to different poultry breeders. Each breeder supplied twenty-four birds of the same age, breed, and, as far as possible, of the same strain. These birds were divided into groups of eight and placed in a large shed for intensive attention with a similar number of birds of other breeders. By working along these lines it was thought that the average breeding of the birds in each pen would be uniform, and in order that the breeders who supplied birds would gain some advantage, the birds were all trap-nested and their owners supplied fortnightly with the progressive results of egg production.

Feeding.

The system of feeding was to place a mixture in the form of dry mash in hoppers. The grain was also fed in hoppers. Under these conditions the birds were at liberty to consume as much as they desired of either mash or grain. In "A" pen the mash was composed of 37 per cent. of maizemeal, 20 per cent. of bran, 15 per cent. of lucerne meal, 10 per cent. of pea meal, 10 per cent. of meat meal, 5 per cent. of cotton seed meal, 2 per cent. of bone meal, and 1 per cent. of salt; while the grain supplied was whole yellow maize. In pen "B" the mash consisted of 52 per cent. pollard, 26 per cent. bran, 12 per cent. lucerne meal, 7 per cent. meat meal, 2 per cent. of bone meal, and 1 per cent. of salt, while the grain supplied was wheat. In the other pen neither bran nor pollard was used in compounding the mash, a feature of considerable importance to poultry raisers in Queensland. The mash, in this case, consisted of 52 per cent. of maize meal, 15 per cent. of lucerne meal, 10 per cent. of pea meal, 10 per cent. of meat meal, 10 per cent. of cotton seed meal, 2 per cent. of bone meal, and 1 per cent. of salt. With the grain supply another departure from the usual practice was adopted in the feeding of barley. In addition, a quantity of lawn clippings was supplied to each pen regularly.

AVERAGE FOOD CONSUMPTION.

	Pen A.	Pen B.	Pen C.
	Lb. oz.	Lb. oz.	Lb. oz.
Grain per bird	38 1	57 4	43 6
Mash per bird	31 3	18 5	27 5
Total	69 4	75 9	70 11
	oz.	oz.	oz.
Food consumed daily per bird ..	3·4	3·7	3·4

Laying.

The laying of the birds was not of an exceptionally high standard. This, however, must not be attributed to inferior stock or to an inferior method of feeding; for the ration supplied to pen "B" conformed very closely to that used in many egg laying competitions. The poor laying was undoubtedly due to (1) changed housing conditions; (2) sudden change in diet; and (3) change of environment at a critical period. The last reason caused many birds to break into a slight moult and, in many cases, a full moult.

The following table gives the final results for each breeder, as well as the total production in each pen:—

From 1st May, 1929, to 30th March, 1930.

Owner.	Total Eggs Laid. 1st Grade.	2nd Grade.	Total Value. £ s. d.
White Leghorns.			
A. A. Cousner	1,900	1,135	16 18 0
Queensland Hatcheries	1,185	1,590	16 4 4
Geo. Currie	1,867	1,042	16 2 8
W. E. Woodward	1,819	1,172	16 2 1
Ray Harrison	1,529	1,220	15 3 11
Geo. Cox	1,507	1,086	13 16 7
H. M. Campbell	1,274	1,256	12 16 9
H. L. Marshall	1,460	813	12 11 8
Geo. Pitt	887	1,413	12 8 9
Woodlands Poultry Farm	1,494	953	12 6 9
Australorps.			
J. D. Hiddle	1,604	1,064	14 12 7
P. U. Gooch	1,530	957	14 8 8

Total Production.

Pen A.—11,750. Pen B.—12,229. Pen C.—11,380.

Eggs Laid in each Pen from 1st May, 1929, to 22nd March, 1930.

Eggs Laid.	Pen A.	Per centage.	Pen B.	Per centa e.	Pen C.	Per centage.
First Grade	6,371	55·8	5,239	44·0	6,285	57·0
Second Grade	4,180	36·6	5,354	45·5	4,012	36·4
Eggs under weight	870	7·6	1,305	10·5	719	6·6
Totals	11,421	..	11,898	..	11,016	..
Eggs laid out traps	211	1·8	245	2·0	262	2·3
Average number of eggs laid per bird	Pen A. 137·2		Pen B. 145·7		Pen C. 129·0	

Two features brought out in this test were—

(1) The wheat ration gave better production; and

(2) In both cases where maize was extensively used the proportion of first grade eggs was greater than that from the wheat ration; there were also considerably fewer undersized eggs produced, as will be seen in the above table.

No definite conclusion can be drawn from one test of this nature, but there appears to be no reason why maize should not be more extensively used in feeding for egg production, and, when the price justifies it, used practically to the exclusion of wheat and wheat by-products.

Although fewer small eggs were obtained from the maize-fed pens, the production of individual birds, in some instances, show that a greater proportion of second grade eggs was produced by the maize-fed pens. This is shown in the results obtained by breeders 4, 7, 8, and 12 in the following table:—

EGGS LAID (EXCLUDING UNDERSIZE) FROM 1ST MAY, 1929, TO 22ND MARCH, 1930.

Breeder.	Pen A.		Pen B.		Pen C.	
	1st Grade.	2nd Grade.	1st Grade.	2nd Grade.	1st Grade.	2nd Grade.
1	609	334	445	324	464	228
2	568	285	580	518	652	356
3	333	425	137	687	416	285
4	499	231	670	210	277	329
5	778	244	339	510	731	288
6	540	321	439	592	522	159
7	344	564	313	478	523	520
8	557	347	692	327	639	453
9	671	269	330	463	509	480
10	549	233	418	424	517	295
11	249	450	532	557	475	241
12	674	477	344	264	560	318

Values.

The table showing the quantity of food consumed for each dozen eggs and the profit over cost does not indicate any very marked advantage in the feeding of maize. However, during the greater portion of the testing period maize was costly, but when the quantity required to produce a dozen eggs is taken into consideration, it will be noticed that there is a slight advantage. With the maize ration, accordingly, when maize is cheaper than wheat it would be a sound policy for it to be extensively used, providing the change in diet is made a gradual process.

TABLE SHOWING FOOD CONSUMED PER DOZEN EGGS, AND COSTS, NET MARKET RETURNS AND PROFIT PER DOZEN EGGS OVER FEEDING COSTS.

Period Ending.	Food Consumed per Dozen Eggs.			Cost of Feed per Dozen Eggs.			Nett Egg Prices per Dozen.	Profit per Dozen Eggs over Feeding Costs.		
	Pen A.	Pen B.	Pen C.	Pen A.	Pen B.	Pen C.		Pen A.	Pen B.	Pen C.
	Lb.	Lb.	Lb.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
1929.										
6 June ..	6·9	8·3	8·2	8·6	9·5	11·6	22·7	14·1	13·2	11·1
29 June ..	6·9	8·6	7·7	8·7	9·7	10·8	16·9	8·2	7·2	6·1
27 July ..	7·2	7·2	8·1	8·2	8·2	11·4	14·4	6·2	6·2	3·0
24 August ..	4·3	6·0	5·2	5·6	6·8	6·7	11·4	5·8	4·6	4·7
21 September	4·6	4·3	4·2	6·0	5·4	5·9	10·5	4·5	5·1	4·6
19 October ..	5·6	5·1	5·2	6·9	5·9	6·7	10·6	3·7	4·7	3·9
16 November	4·4	5·7	6·6	5·4	6·5	8·8	10·6	5·2	4·1	1·8
14 December	6·2	5·2	5·6	7·7	6·0	7·5	11·9	4·2	5·9	4·4
1930.										
11 January..	5·2	5·7	5·8	6·4	6·5	7·7	11·0	4·6	4·5	3·3
8 February	9·8	6·1	7·6	12·2	7·0	10·2	12·7	0·5	5·7	2·5
8 March ..	11·9	8·1	12·1	14·7	9·3	16·1	13·8	*0·9	4·5	*2·3
22 March ..	12·4	12·1	11·2	15·4	13·9	15·0	15·4	..	1·5	0·4
Average ..	6·1	6·2	6·5	7·5	7·1	8·7	13·6	6·1	6·5	4·9

NOTE.—The asterisk denotes that a loss resulted in A and C pens.

Effect on Bodily Weight.

All birds were weighed on entering the test, and those in lay were weighed once every four weeks when removed from the trap nests, and a final weighing was made when the birds were crated and returned to their owners.

The following is the average weight of each lot on entering the test, and again at the termination:—

Lot.		Pen A.	Pen B.	Pen C.
		Lb. oz.	Lb. oz.	Lb. oz.
1	Commencement	5 3	5 3	5 1
	Termination	4 14	5 2	4 14
2	Commencement	4 1	4 2	4 6
	Termination	3 15	4 2	4 1
3	Commencement	3 2	3 3	3 3
	Termination	3 6	3 4	3 5
4	Commencement	4 3	4 5	4 1
	Termination	3 12	3 13	3 10
5	Commencement	3 9	3 9	3 11
	Termination	3 8	3 8	3 7
6	Commencement	4 8	4 4	3 12
	Termination	3 8	4 1	3 2
7	Commencement	3 9	3 11	3 10
	Termination	3 15	3 11	3 5
8	Commencement	4 3	4 1	3 11
	Termination	3 12	4 0	3 11
9	Commencement	4 3	4 3	4 3
	Termination	3 7	3 8	3 12
10	Commencement	4 2	4 0	3 11
	Termination	3 14	3 13	3 7
11	Commencement	3 11	3 10	3 11
	Termination	3 11	4 0	4 0
12	Commencement	4 14	5 3	5 3
	Termination	4 13	5 1	4 10

Extensive maize feeding is credited with causing the birds to become unduly fat. There is absolutely no evidence of that being the case in this test.

Mortality.

During the currency of the test the mortality of stock was exceptionally heavy, being as follows:—

Cause.		
Pen A. 14 Deaths.	Pen B. 26 Deaths.	Pen C. 16 Deaths.
Protrusion 4	Roup 7	Roup 6
Intestinal Tumor .. 3	Hemorrhage of Liver 3	Wasting 3
Heat 2	Wasting 5	Tumour 4
Kidney Disorder .. 2	Kidney Disorder .. 2	Kidney Disorder .. 1
Wasting 1	Heat 2	Hemorrhage of Liver 1
Hemorrhage of Liver .. 1	Not Diagnosed .. 4	Protrusion .. 1
Roup 1	Tumour 2	
	Protrusion .. 1	

COCCIDIOSIS IN CHICKENS.

Notes on this subject by Mr. P. Rumball, Poultry Expert, were published in the Journal for November, 1927, and, in response to numerous requests from our readers, they are now reprinted after revision (in the absence of Mr. Rumball, who is attending the World's Poultry Congress in England) by Mr. J. J. McLachlan, Poultry Inspector.

THIS is probably the most destructive disease affecting chickens in Queensland. The disease, however, is not confined to chickens only, as well developed pullets frequently lose the use of their legs as a result of infection, while adult birds are often affected in a chronic form. Death from chronic infection may take place in a few days, or the bird may linger several weeks. With chickens between the ages of two and eight weeks the disease assumes serious proportions, particularly so under favourable conditions.

Cause.

Coccidiosis is caused by microscopic parasites termed *Eimeria Avium*, which when taken into the digestive tract by susceptible chickens rapidly develop and multiply in the walls of the intestines, particularly the cæca or blind gut.

PLATE 102 (Fig. 1).

Showing cæca and portion of opened cæca from two 4-week old infected chicks Note the red blotches where these parasites have damaged the inner walls of this organ. This condition is not always so pronounced.

Life Cycle.

In the completion of its life cycle the parasite passes through many stages of development. A knowledge of certain of these forms is of practical importance in the application of efficient methods of prevention and ontrol.

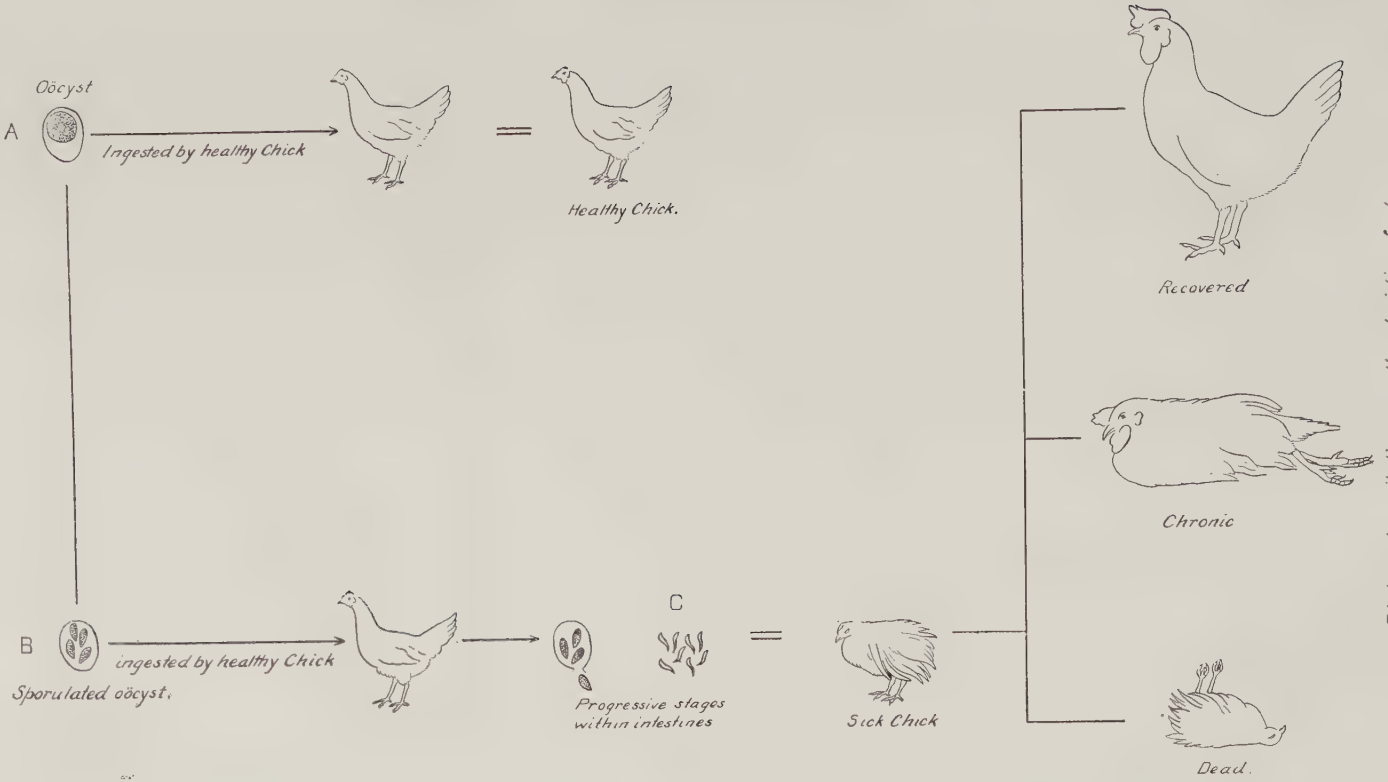


PLATE 103 (Fig. 2).
Showing life cycle of *Eimeria Avium*, the cause of Coccidiosis.

The first, or egg stage, is known as the oöcyst, the organism being encompassed by a covering which is comparable to the outer membrane of a hen egg, and by a fluid like the white of an egg; this organism is similar in shape to the yolk of an egg (see Fig. 2A). These oöcysts are voided with the droppings of diseased birds. In this stage the organism will not cause coccidiosis if taken back into the digestive system. The conditions under which chicks are generally reared, however, lend themselves to sporulation or the second stage of development (see Fig. 2B). In making this change a period of two to three days is required, depending on the suitability of conditions. Moisture and temperature are the governing factors. When changing, the part which compares with the yolk divides into four bodies. In this stage the parasite is capable of producing the disease in approximately forty-eight hours, and when the sporulated oöcysts are taken into the digestive tract of chickens another change takes place. The four bodies are released, and again divide. These are termed "sporozoites" (Fig. 2C). The parasite then begins to live on the mucus lining of the intestine and cæca, undergoing several changes until eventually the oöcyst or egg stage is produced and is voided with the droppings.

Knowing a little of the life cycle of this parasite, which takes five to six days to complete under favourable conditions, it can be readily understood how rapidly it will multiply, also the easy manner in which it is transmitted from chick to chick, by sporulated oöcysts adhering to particles of food or even per medium of the drinking water. It can be carried from pen to pen by adhering to the attendant's boots; flood waters, flies, wild birds, brooder equipment, and many other ways are also responsible for transmission of this disease from pen to pen and farm to farm. It is claimed by some authorities that the sporulated oöcyst will remain alive in the soil for over a year. Breeders, therefore, who have experienced this disease should take precautionary measures to prevent its recurrence by disinfection and the spelling of pens.

Symptoms.

The first indication of the disease is the tendency of the chicks to bunch together, with closed eyes and drooping wings. On being disturbed they move about, apparently quite normal, with the exception that their backs appear to have somewhat shortened. The tips of their wings, vents, and rear portions of their bodies are frequently stained with excreta. If an examination is made of the excreta of the chickens it may be found to be brick-red in colour, due to the presence of blood in the droppings. The parasites living on the mucous lining of the intestines cause the destruction of small blood vessels resulting in hemorrhage. However, blood is not always present in the droppings. During the day or the following morning some of the chicks will die, and the number of shortened-backs and droopy-winged chickens will have increased.

PLATE 104 (Fig. 3).—CHICK WITH COCCIDIOSIS IN SEVERE FORM.
Note the tips of the wings are stained with blood.

On opening up one of the dead chicks the upper portion of the small intestine will be found to be in an inflammatory condition. Blood may be also present among its contents. These conditions are usually more pronounced in the cæca of the chick, which is generally distended and filled with blood. In many cases, the lining of the cæca will have completely disappeared. The other internal organs are generally in a healthy condition. Chicks which survive severe cæcal coccidiosis usually have yellowish or whitish cheese-like "cores" in the cæca in a few days following the development of the symptoms. These cores signify that the disease has run its course. They are not uncommon in chickens in good health. When the core is covered by skin-like material and the interior of it is reddish and crumbly, it is probably due to coccidiosis.

The chronic type of the disease which affects older birds develops slowly and may only affect a few birds in a flock. The outward symptoms are loss of appetite, roughened, dirty plumage, gradual loss of flesh, paleness of the comb and wattles, stilty movements, paralysis of the legs.

The disease in this form is very easily confused with many other poultry ailments, and the symptoms shown are similar to those caused by other poultry parasites. Post mortem examination will reveal that lesions are usually confined to the small intestine. The intestinal walls become somewhat thickened, and the lining has a spongy appearance. In severe cases red blotches may be present. The cæca rarely show any change.

Treatment.

Medicinal treatment has been found to be of little value, therefore preventive methods must be adopted and, in outbreaks, the worst cases destroyed. As the general stamina of the chickens is the best safeguard against any disease, it is essential that the chicks should receive the best care, attention, and feeding. Also, as the parasite in the oöcyst stage is harmless, and sporulation is only possible where the favourable conditions of moisture and warmth prevail, brooder houses should be as free from dampness as possible. The congested conditions under which chickens are reared naturally lead to foul pens and brooders, making them a hot-bed of infection. In conjunction with the fact that two days must elapse for the oöcyst to permit of sporulation, it can be readily understood that by thorough cleaning daily, and frequent disinfection, the disease may be controlled. The practice of scattering grain in the runs, very desirable as a rule, should be discontinued when the disease is present. Grain and all food should be fed in receptacles that can be cleaned once or twice daily. Drinking vessels should be placed off the floor on frames that will prevent the access to moist places by the chicks.

Outbreaks can be controlled by the feeding of buttermilk powder, or fresh skim milk, but without the application of strict sanitary measures in conjunction with the milk diet success in the control of this disease cannot be expected. Where fresh skim milk is available this can be used as the only form of drink. Buttermilk powder may be used solely for twelve to twenty-four hours in cases of severe outbreaks, after which it may form 20 per cent. of the mash, until the disease is checked. This period may last from three to six days. The buttermilk can be then reduced to 10 per cent.

Buttermilk powder not only has curative properties in connection with coccidiosis, but it is a splendid food for both laying and growing stock, particularly so with young chicks. Poultry raisers could make this food form a definite portion of all mashes. With the use of 10 per cent. buttermilk in the mash no other form of protein is required.

The feeding of milk in any form has a tendency to cause the droppings to become very liquid in nature and, consequently, more frequent cleaning is necessary.

THE JOURNAL APPRECIATED.

A Mackay farmer, renewing his subscription, writes (15*th August*, 1930): "*I am very pleased to have such a journal because of the advice and information it contains, and of its general sound policy for the betterment of the farming industry.*"

RETIREMENT OF MR. H. W. MOBSBY.

An interesting function took place in the office of the Minister for Agriculture and Stock on 20th August, when a large gathering of officers, representatives of all sections of the Department, attended an official farewell to Mr. H. W. Mobsby, F.R.G.S., F.R.S.A., Artist and Photographer of the Department, on his retirement from the public service.

The Minister (Hon. H. F. Walker), in presenting a wallet of notes to Mr. Mobsby as a token of the esteem in which he was held by his fellow-officers, referred to his long and faithful services, extending over a period of more than thirty-one years, during which term he was attached mainly to the Department of Agriculture and Stock, but for a limited time to the Chief Secretary's Department and the Intelligence and Tourist Bureau.

PLATE 105.—MR. H. W. MOBSBY, F.R.G.S.

The Minister spoke in eulogistic terms of Mr. Mobsby's work in connection with photographic art, which was recognised throughout Australia and overseas, and pointed out that he had been a great asset in placing before the world in photographic and other forms the attractions of his State. He also recalled Mr. Mobsby's services as official representative at the Franco-British Exhibition, the Panama Exposition, the British Empire Exhibition, and the Dunedin Exhibition, and added that he had also effectively represented the State at Exhibitions in metropolitan centres in the other States. Mr. Mobsby had the good fortune to also accompany high dignitaries through Queensland, amongst whom were the Prince of Wales and the Duke of York.

The Minister assured Mr. Mobsby that he left the Department to enjoy an honourable period of retirement with the goodwill and best wishes of every member of it.

Messrs. E. Graham (Under Secretary), H. T. Easterby (Director, Bureau of Sugar Experiment Stations), J. P. Orr (Registrar, Primary Producers' Organisations), and T. C. Troedson (Intelligence and Tourist Bureau) supplemented the Minister's remarks.

Mr. Mobsby, in reply, feelingly expressed his thanks for the good wishes and the tangible token of esteem presented by his fellow officers, and referred to various incidents which had occurred during his visits abroad as Departmental representative at overseas exhibitions. Addressing the younger officers directly, he said that nothing was ever denied to well directed diligence. He counselled them to give of their best to the world and the best would return to them. Good enough was not good enough—Australia must have the best.

A NOTABLE CAREER.

A native of Brighton, England, Mr. Mobsby was educated at Hampton Place High School, in his home city. It was as a lad that Mr. Mobsby got his first taste of exhibition work, when he accompanied his father in his official capacity to the Agricultural Exhibition held on the Goldsmid Estate, Hove, Brighton, England. He studied art and design at the School of Arts, Brighton, and decorative art under Mr. A. G. Greysmith, artist, of London and Brighton. His first personal connection with any exhibition was when he assisted Mr. Greysmith at the Heatheries at the Royal Pavilion Building, Brighton.

After studying chemistry and following a course of general commercial training he left England for Brisbane in 1883, accompanying Mr. W. Jenner, the well-known artist, and his family, Mrs. Mobsby being the eldest daughter of the late Mr. Jenner.

Mr. Mobsby was for some years a member of the teaching staff in decorative art and lettering at the Brisbane Technical College when Mr. D. R. McConnel was director.

Since 1897 he has been attached to the Department of Agriculture and Stock, Brisbane, as Government artist and photographer, and it is during that period that he became so closely connected with this State's interests at the Australian Natives' Association Exhibitions at Melbourne for several successive years, also at Adelaide and Sydney and at the Royal National Show at Brisbane each year. In 1908-9 Mr. Mobsby designed the Queensland Court at the Franco-British Exhibition, and travelled as State representative to London with the late J. M. Campbell to supervise the construction of the lay-out, design trophies, and colour scheme.

While in England he exhibited Queensland products at Newcastle, Lincolnshire, Gloucestershire, also at Aberdeen in Scotland and Dublin, in Ireland. When Sir H. Tozer was Agent-General he transposed Gattis Restuarant, in the Strand, to the present Agency-General, supervising fitting up, furnishing, and laying out the first display of Queensland products in London.

It was while Mr. Mobsby was at the Franco-British Exhibition he was instrumental in raising £166 8s. 2d. in pennies at the Saturday Hospital Fund, which enabled a Queensland cot to be established in the Queen Alexandra Hospital.

The year 1915 saw him again designing and supervising Queensland's Court at the Panama-Pacific Exposition at San Francisco, United States of America, the late J. A. Robertson being Queensland Commissioner, who before the closing retired from the position, and Mr. Mobsby was appointed Acting Commissioner in Charge by the Queensland Government. He was also appointed by the authorities of the Panama-Pacific International Exposition to act on the jury of awards in the wine section, for which he was awarded a medal for special services. While in America Mr. Mobsby gained a diploma and medal for photography, also certificate of efficiency in motion picture work.

After carrying out Australian Natives' Association Exhibitions at Melbourne and the Peace Exhibition at Adelaide, Mr. Mobsby was in 1924 appointed by the Government on the Wembley Commission as State organiser for the Exhibition at Wembley, England. He then went to London by appointment of the Federal Government as display officer at the Wembley Exhibition. At the intervals between exhibitions Mr. Mobsby visited all parts of the State as the official photographer, obtaining pictures of the industries associated with his Department, also scenic pictures which have been used for technical and other publications and lectures all over the world, as well as supplying the Tourist Bureau with pictures in advertising Queensland's productive wealth and scenery, also Departmental record and specimen work in animal and plant pathology by ordinary and micro-photography.

In 1925-26 Mr. Mobsby was appointed by the Government to organise and design the Queensland Court at the New Zealand and South Seas Exhibition at Dunedin, New

Zealand, and afterwards supervised the construction, and was Queensland's representative in charge during the currency of the Exhibition. The display was awarded a gold medal and diploma.

That Mr. Mobsby has not held these positions except on merit is proved by the fact that he holds a number of diplomas, certificates, and fellowships which have been gained in fields which have fitted him for his work, amongst which may be mentioned: Fellow Royal Geographical Society; Senior Diploma Chamber of Commerce, England; Senior Diploma City and Guilds, London; Senior Diploma Cripplegate Institute, London, each for theoretical and practical photography; Medallist World's Photo. Competition; and Fellow of the Royal Society of Artists. He is also honorary lanternist to the Royal Geographical Society of Queensland.

Mr. Mobsby made many friends in his travels overseas and in Australia, where, by his experience and artistic taste, his work has been much appreciated to the benefit of Queensland generally, also in the information obtained and reported to his State and which was afterwards used in extending the State's commercial enterprise overseas. He has been personally instrumental in securing valuable settlers for Queensland, and generally he has given of his best to the service of his adopted State.

On the lecture platform he is also well known, and as a valued public officer he will be very difficult to replace. As a contributor to the "Queensland Agricultural Journal," both by picture and pen, Mr. Mobsby has earned the high appreciation of our readers, everyone of whom will wish him well in the years of his honourable retirement after a lifetime of public service.

PLANT BREEDING AT ROMA STATE FARM.

By R. E. SOUTTER, Manager, Roma State Farm.

WHEAT.

WORK in connection with this crop was taken up in 1907 and has been carried out continuously ever since. During the period which has elapsed innumerable crosses have been made, only a very few of which have produced selections of sufficient merit to warrant their being distributed amongst the farming community, the names of the most favoured of these being Cedric, Duke of York, Flora, Novo, Three Seas, Warchief, and Watchman.

Cedric.

A result of crossing Cedar and Bunge. This selection, which is red grained, hardy, and fairly rust-resistant, yielded 30 bushels to the acre two years in succession in the variety trials. It was distributed among wheatgrowers and has been grown fairly extensively ever since.

Duke of York.

A selection from (Cretan x Bunge) x Gluyas. The cross was made with a view to embodying the rust-resisting, drought-withstanding, and yielding capabilities of the Gluyas with the upstanding habit and rust resistance of the Cretan-Bunge selection. Although susceptible to flag smut, the objects, in a great measure, were achieved, and to-day the variety is favoured by quite a few farmers on the Downs.

In 1928 it was awarded second place in the Toowoomba district competition and third in the Grand Champion.

In 1929 it gained first and second place in the Toowoomba district, came second in the Warwick, and won the Grand Championship, and was also the only crop which secured full points for evenness.

Flora.

A selection from Bobs x Florence, the object being to evolve a selection with the fine milling qualities of Bobs in combination with the resistance to smut and other desirable characteristics of the Florence variety.

Smut resistance was not secured in this selection, but the grain is of pleasing appearance, straw is of medium length, fairly hardy, and rust-escaping, and, although not a heavy yielder, is favoured by a few growers on account of consistency.

Novo.

A Bunge-Indian Pearl cross; a very suitable variety for dry localities; is grown fairly extensively in the Maranoa and parts of the Downs, more particularly Allora, where a yield of 42 bushels to the acre has been obtained. Straw is inclined to be a little weak; escapes rust if sown as a main crop, and produces a grain of good appearance.

Three Seas.

(Cretan x Comeback) x Comeback. The object of this cross was to produce a wheat of good milling quality with a high degree of rust resistance. This latter object was attained, for, during a rust visitation some few years ago it proved to be least infected or affected of all the varieties and selections under observation. It further demonstrated its resistance on the Downs by producing a summer crop of eight bags when varieties like Florence grown alongside were absolutely rendered worthless. Being a bearded variety with a soft grain susceptible to weevil infestation precludes it from being recommended extensively, but some very promising crosses, bald, and early and late in habit, with a good, hard grain, have been under observation for some time, but until their degree of rust resistance has been determined they cannot be distributed.

Warchief.

Soutter's Early x Warren. Same breeding as Watchman, with the field characteristics of Warren—that is, late, good rust resister, hardy, but the grain is of better quality. Was and probably is still grown in some localities in preference to Warren, which variety produced crops heavily infested with loose smut a few years ago. Warchief is suitable for early sowing for hay, grain, or grazing.

Watchman.

This is a selection resulting from crossing Soutter's Early and Warren. The object in making this cross was in an endeavour to combine the earliness and quality of the grain of the former with the rust-resisting, stooling qualities, hardiness, and palatability to stock of the latter. With the exception of some of the more recent crossbreds under observation, this is the earliest variety we have, is extremely hardy, escapes rust. Its hardiness may be gauged from the fact that it is capable of producing a crop of nice, plump grain under conditions fatal to many of the slow-growing varieties.

In 1928, sown in June first, harvested October third week, on a rainfall during the growing period of 234 points, it yielded 25.6 bushels to the acre, whilst in 1929, sown in June and harvested in October, on a rainfall during the growing period of 70 points, it returned nearly 15 bushels to the acre.

The method adopted in connection with the initial operations of crossing varieties are practically the same everywhere, special care being taken to prevent the introduction of foreign pollen when emasculating when pollenising and immediately after.

Although reciprocal crosses are frequently made, it is usual to select as the male parent the individual with the most pronounced dominant characteristics, such as baldness, red chaff, pubescent glumes, &c., so that the intrusion of foreign pollen is more readily discernible in resulting plants. The grains produced are put into containers showing parentage, when cross was made, and harvested, &c.

In the following season these grains are sown in a situation well away from fences and trees and wholly surrounded by early-sown crops so that the chance of injury by birds, &c., is reduced to a minimum.

In all the preliminary work here the grains are sown from 10 to 12 inches apart in the rows, with rows 2 feet apart. This procedure is absolutely essential under our conditions, where the rainfall has to be wholly depended upon to bring the plants to maturity, permitting as it does of inter-row cultivation, thereby enabling full use to be made of the soil moisture by preventing loss through evaporation and foreign growth.

With this system of sowing we have not had a break in the work. By this is meant that the sowings have always provided sufficient seed to carry on, notwithstanding that field crops sown on adjacent plots on similar soil prepared in the same manner have practically failed on more than one occasion.

Last year, on a rainfall of 70 points during the growing period (1st May to 10th October), some of the drills in this section yielded from 14- to 25-bushel rate per acre, whereas in another section, where the drills were 10 inches apart and plants more closely in the rows, on the same class of soil with the same working the yields ranged the rate of 2 to 12 bushels per acre.

When harvesting the grain of the conjugate plants all weak-constitutioned plants are eliminated, and, although not necessary, the grain from the individual plants is saved separately for sowing the next season.

The year following selections are made of those plants of good promise.

In the next season fixed types having desirable field characteristics are selected for further sowing, and further selections made of desirable types met with in unfixed rows.

The following season fixed types selected last year deemed worthy of further trial are tested in chain drills at the farm and by the officers of the Field Branch on the several farmers' plots, so that their behaviour under varying conditions on different types of soil as well as their susceptibility or otherwise to the prevailing kinds of rust may be more readily ascertained.

These sowings are usually made with a seed drill at the rate of a half bushel to acre, drills 2 feet 6 inches apart, with every fifth row sown with the standard variety of the district on soil worked according to instructions received from the Field Branch. Notes as to behaviour and yields recorded at the Farm and by officers, Field Branch.

The next sowing includes all those possessing desirable characteristics. They are sown in the same manner and in the same locations as in the previous season.

The next year the work is practically a repetition of the two previous—elimination of undesirables—but extended areas of any very outstanding selections are sown.

The following year the very few which have proved themselves to be rust-resistant, hardy, with desirable field characteristics, of good milling quality, and better yielders than the standard varieties, are sown in extended areas.

The adoption of the system employed at the Minnesota Station in connection with "Grain Improvement" is being considered. In fact, last season a step in this direction was made, but owing to the very adverse conditions the results were not satisfactory and seem to indicate that the methods adopted in connection with sowing them will have to be altered to meet the conditions here.

BARLEY.

Not very much has been done with this crop. In 1917 a skinless barley was crossed with a two-rowed type, more for the purpose of studying the inheritance of characteristics than anything else.

Resulting from this crop we have half a dozen very promising selections from a green feed or grain-producting standpoint.

Their suitability or otherwise for malting purposes has not been ascertained.

With the exception of the treatment received by the florets when emasculating, the methods employed in evolving a barley variety are similar to those adopted in connection with wheat.

COTTON.

Work in connection with this crop was commenced in 1923, and consisted in testing a number of plants selected on account of their productiveness.

The lint resulting from sowing the seed of these selections was submitted to the Chief Cotton Grader to report upon, with the result that two selections were returned as being worthy of continuing with, one of which is still under observation.

In 1925 selections were made of an Okra-leafed type of cotton found growing in a crop of Durango, for the reason that it was considered possible that this type of foliage might result in the plants being more drought-resistant in a dry climate, less susceptible to disease in a wet, facilitate picking by hand, and afford less impediment to mechanical pickers.

At the present time we have the following under observation:—

3 Okra-leafed selections	⊕	(selfed).
1 Dwarf Durango	⊕	(selfed).
2 Durango sel.	⊕	(selfed).
3 Tall Durango	⊕	(selfed).
1 Variegated Durango	⊕	(selfed).
1 Clean Seed Durango	⊕	(selfed).
1 Okra leaf sel.	⊕	(selfed).
1 Brown seed	⊕	(selfed).
1 Green x Variegated		(selfed).

Progress is slow with this crop owing to the fact that the last two years sufficient rain to sow on has not been experienced until the summer was well advanced, the insect injuries very great, with the result that very little seed has been produced.

Last year a little black beetle appeared whose habits necessitated the covering of any flowers with paper covers where pollen contamination was not desired. Such covering in this climate brings about a sweating resulting in the shedding of many of the flowers.

COWPEAS.

Work with this crop was commenced in 1913, the idea being to evolve, if possible, quick-growing varieties for green manuring purposes, erect growing, kinds suitable for mowing with machinery for conserving in the form of hay or silage, combined with a non-susceptibility to nematode, and improved seed production.

Three selections resulting from this initial work have been grown here on soil heavily infested with nematode for a number of years. Seeds of these have also been distributed outside. More recently attention has been directed to the evolving of nematode-resistant types of several of the best existing varieties as well as the production of fine-growing varieties for conserving in the form of hay and heavy-seeding varieties, which latter kind it is hoped will supply the deficiency in proteins in the pasture in the winter and spring in the same manner as the sheep man is assisted in Western Australia by the lupin in the summer.

It is found that large-seeded varieties produce plants which, during the first two or three weeks of their existence, are much better able to contend with adverse circumstances than those emanating from small seeds. More particularly does this apply to sowings germinating late in the spring on light, sandy soils inclined to blow.

Progress with this crop is rapid, for, with an early germination in the spring, investigations can be carried out with two generations in the one season.

The method adopted in connection with sowing here is as follows:—

Spring sowing.—Three or four seeds are placed in hills 6 feet apart in rows with rows 12 feet apart. Thinned out to individual plants when coming into the 5 feet or 6 feet leaf.

Second sowing (middle January).—Three or four seeds in hills 6 feet apart with rows 6 feet apart.

It has been found that dark-coloured beans are not so susceptible to attack by weevil as the lighter coloured.

Notwithstanding the adverse conditions, we have under observation and looking well sixty-two selections from the following crosses, viz.:—

(Skewbald x Large White) x Californian Black and White.

Large White x Skewbald x Mammoth.

Poonah x New Era x Mammoth.

Home Hill Clay x Poonah Selection.

Home Hill x Mammoth.

Large White x Skewbald x Californian B. and W. x Skewbald.

((Large White x Skew) x C.B. and W.) x Californian B and W.

Snake x Poonah.

Poonah Selection.

Snake x Poonah x Californian B. and White.

PUMPKINS.

A few crosses have been made and are being followed up, but the stabilisation of a strain or strains of the so-called Beaudesert Pumpkin is the chief concern at present. Progress has been much hampered by adverse seasons and the presence of nematode in the soil.

The method adopted in connection with pollination is as follows:—

If selfing is to be practised, the evening before the flowers open a string is put round each of them, a male and female, if possible on the same runner, and drawn sufficiently tight to prevent opening. In the morning the string, which, by the way, should have been put on close to the point of the flower, if further tightened cuts off the top of the flower, exposing the male or female organs as the case may be. If the morning is bright, in the male flower, which should be the first treated in this way, it will be observed that the anthers have dehisced and a lot of loose pollen has collected at the base. By careful breaking back the corolla, but so as to still retain the pollen, it can be made sufficiently small to permit of its introduction to the reproductive organs of the female flower without undue interference to its corolla, which is essential, as this has to be again tied up after the operation to prevent contamination by foreign pollen through insect or other agencies.

OTHER CROPS.

Field Peas.

The dry winters experienced here are not as favourable for the development of this crop as in the Southern States or more favoured portions of Queensland. Nevertheless a fair amount has been accomplished since 1924 when the work was first taken up, and at present some ten promising selections resulting from crossing Paragon (Field Pea) and Improved Stratagem are under observation.

Soudan Grass.

Work in connection with this crop was commenced in 1920, consisting chiefly in isolating several strains, some of which appeared to be the result of sorghum crossing, and having them tested by the Agricultural Chemist in order to ascertain their suitability for stock at varying stages in their growth under varying conditions.

Unfortunately, owing to a run of adverse seasons and the lack of conveniences for watering, the results were lost, only one strain being saved, which is under observation this season.

Citrus Fruits.

At present we have under observation twenty budded trees mostly "grape" fruit crosses made in 1923.

In order to expedite this work as soon as the seedlings are large enough to furnish buds so are they budded on to suitable stocks.

This section of the work has also suffered owing to lack of water, a number of crosses in which the Washington Navel orange was the female parent having been lost.

Grapes.

Crossing was first done in 1920, and a number have been made since with the result that at present there are two or three rather promising plants under observation.

Owing to the time which must elapse before a seedling gives a reliable showing on its own stock, grafting is to be the practice in future.

As some of our own seedlings appear to be little affected by nematode, more especially those resulting from crossing Cinsant with Rupestris, they are to be used as the stocks.

The crosses have been many and varied, but as with other crops, owing to the unfavourable conditions and lack of facilities for watering more plants have died than have matured.

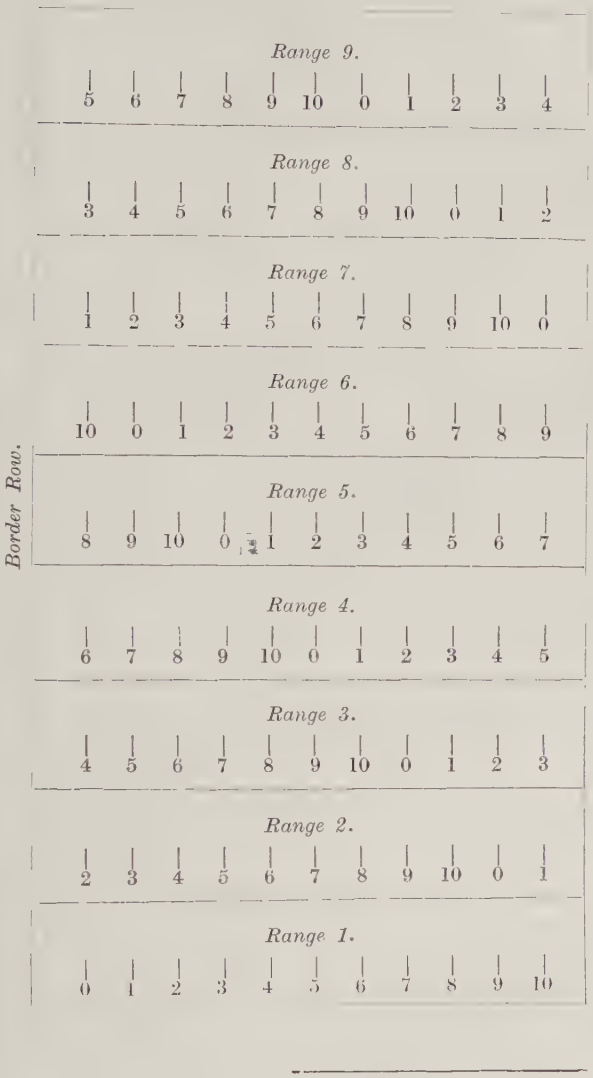
One of the original crosses affords a most wonderful illustration of "heterosis."

It was put out in a row of vines where one had died which had been planted twenty years previously. The whole row of the vines at the time looked sickly, the most robust not producing wood more than 6 feet in length and very spindly at that. Last season the seedling produced many shoots over 30 feet in length of a stoutness in proportion and a fair crop of fruit.

Peanuts.

No crossing has been attempted in connection with this crop, but all varieties are being tested. Plan of 1929 sowing follows.

Different kinds of pegs are used for marking the positions of the emasculated and pollinated flowers in the field. When fecundation has been accomplished oiled labels are attached on which appears the cross made, parentage, &c., and when made. This and any other notes are recorded in field book.



Rows 4 feet apart.

Plants 2 feet apart.

Fifteen plants to row.

Thirteen used to determine yield.

Varieties O.

0. Office Threes
1. Wilson's Sel. 1
2. Wilson's Sel. 2
3. Wilson's Sel. 3
4. Wilson's Sel. 4
5. Wilson's Sel. 5
6. Wilson's Sel. 6
7. Wilson's Sel. 7
8. Wilson's Sel. 9
9. Wilson's Sel. 9
10. Wilson's Sel. 10

QUEENSLAND SHOW DATES.

Imbil: 3rd and 4th September.
Malanda: 5th and 6th September.
Gympie: 10th and 11th September.
Redcliffe: 12th and 13th September.
Noosa (Pomona): 17th and 18th Sept.
Beenleigh: 19th and 20th September.
Rocklea: 27th September.
Esk Campdraft: 26th and 27th September.
Kenilworth: 27th September.
Southport: 3rd and 4th October.
Enoggera: 4th October.
Nerang: 10th October.

TOBACCO GROWING IN NORTH QUEENSLAND.

MINISTERIAL ANNOUNCEMENT.

THE Minister of Agriculture and Stock, Hon. Harry F. Walker, has announced that for the past three years experiments in tobacco growing have been carried out under the auspices of the Australian Tobacco Investigation Committee. This body, of which Mr. C. M. Slagg, M.S., is the Director, has carried on its work out of funds provided by the Commonwealth and State Governments conjointly with the British Australian Tobacco Company, which company has substantially subsidised the project and has been largely instrumental in the developments that have taken place. Experimental plots have been tested under the direction of the Department of Agriculture and Stock in widely separated areas, ranging from Bowen to Mareeba in the north and to Pentland in the west. The problem to be solved was to find soils suitable for producing a bright tobacco, of good burning qualities and with an agreeable burning aroma, such as would prove acceptable to the cigarette and pipe-smoking public. The results of these experiments have so far proved eminently satisfactory. It has been established that such a tobacco can be produced on the poor granitic soils in the vicinity of Mareeba, in North Queensland. There is ample Crown land available there and the climatic conditions are suitable. The experiments have enabled the Department of Agriculture and Stock to lay down the right proportions of chemical plant foods required to be added to the soils to produce the class of tobacco which the market requires.

The annual Australian consumption of cigarette and pipe tobacco is about 20,000,000 lb. The British-Australian Tobacco Company has intimated that it will purchase all tobacco of the right quality grown in Queensland at remunerative prices.

A farmer, generally speaking, can cultivate and cure about 5 acres of tobacco with his own labour. The produce of an acre should not be less than about 500 lb. so that at, say, 2s. 6d. per lb. the gross return from an acre should be about £62 10s., The price mentioned is an arbitrary one and must not be regarded as in any way being a guaranteed one.

Farms at Mareeba.

The Government is convinced that an important industry can be secured for North Queensland by the encouragement of tobacco growing in the Mareeba district. The prospects of the development of the industry have been investigated by the State Consultation Committee on Developmental Proposals which has recommended to the Government that thirty tobacco farms, near Mareeba, be made available to approved applicants for cultivation under tobacco during the coming season which lasts from December to March.

Accordingly instructions have been given to a surveyor and an officer of the Department of Agriculture and Stock, experienced in the results of the tobacco experiments, to design thirty tobacco farms in the locality mentioned. Each farm will have about 60 acres of arable land suitable for tobacco and an area of grazing land up to 200 acres wherever practicable. As the quality of the land is poor it must be definitely stated that the possibility of a farmer making a living out of anything but tobacco is remote.

Land Available.

It is expected that the design of the farms will be available almost immediately. If the land is to be ready for cultivation by December it will be necessary for the successful applicants to get on to their farms immediately in order to clear, stump, and cultivate 5 acres for planting in December.

So that there shall be no delay the Government has arranged with the Land Administration Board to open the farms for Agricultural Homestead Selection under the group system at a purchasing price of 2s. 6d. per acre. Opening under the group system involves the allotting of the lands to successful applicants before the lands are formally opened. It also involves personal residence on the farms on the part of the selectors. Each successful applicant will be required to enter on his farm forthwith and proceed with the clearing and stumping of 5 acres.

Experienced Men Preferred.

Applications, which closed on 31st August, have been received from persons desirous of competing for inclusion as members of the group to which the farms will be allotted. In allotting the farms preference will be given to persons who have had farming (preferably tobacco-growing) experience, who have sufficient capital to carry them on for a year or two, and who will undertake to cultivate

5 acres under tobacco during the coming season from December to February. Each applicant should therefore include in his application particulars of his qualifications under these headings.

Each successful applicant will be assured of the utmost assistance of the officers of the Department of Agriculture and Stock who are versed in the cultivation and treatment of tobacco. These officers will give advice regarding the growing and curing of the tobacco crop.

The Government intends from time to time to make further tobacco farms available to the public.

An important feature of the prospective tobacco growing industry is that the growing period coincides with the slack season in the North Queensland meat and sugar industries and thus ample labour will be available.

TOMATO GROWING IN NORTH QUEENSLAND.

By E. F. DUFFY, Instructor in Fruit Culture.

The principal area for the production of tomatoes for the Southern markets extends from Langford Creek to Wakala, with the main production in the delta of the Don River, at Bowen.

Farmers at the Proserpine districts and also on the delta of the Burdekin River are going in for this crop. Planting begins in January with the first early plot, and go on to May and June for the late crops. Staking of the plants is not at all practised. The plants are put out at distances of 9 by 9 feet, and in some instances further apart. When grown under good conditions the plants cover the whole of the intervening spaces. The Bowen Buckeye, Livingstone Glove, and Burwood Prize are varieties which have mostly been grown. First place is given to the Buckeye variety. Generally speaking, there is an absence of fungoid troubles which attack tomatoes in other districts, nor do they suffer from wet rot which causes so much trouble in other districts where more frequent and higher rainfalls occur.

Consignments carry to Melbourne and Adelaide without losses and in satisfactory condition. A good start with the areas is always achieved during the summer rains, and with the subsequent winter rain which can be generally depended on, good harvesting goes on to October and November.

One of the greatest pests in all light soils is the nematodes which cause the failing or knotting of the roots.

Many of the growers resort to the making of a good log fire on the ground where the seed-beds are to be made.

This presents itself as a good, ready means of destroying the nematodes and thereby giving the young plants a clean start, and also of cleaning the ground of fungus which may cause damping off, or the verticillium fungus which attacks the young plants.

Sterilisation of the beds with formalin is also to be recommended for the achievement of this purpose. The other pest which causes so much heavy losses in tomato growing generally is the larvæ of the Heliothus moth.

If growers would spray or dust the young beds twice before moving the plants with a combined arsenate of lead and Bordeaux preparation, and also do the same three times at intervals after planting out up to the setting of the first fruit, and gather all affected fruit both large and small during the first two "skim" pickings, a big control of this pest would be kept.

The eggs are laid on the young bushes and the larvæ feed on them, and subsequently the eggs are laid on the base of the flowers and on emergence of the young larvæ they bore straight into the young fruit. It is therefore apparent that control measures taken as above would check the subsequent multiplication later on.

Care should be taken in the dying of the young plants in the seed-beds, so that as little damage as possible is done to the roots of the plants, and thereby prevent as much as possible entrance of the fusarium fungus which is responsible for wilt.

The necessity, of course, arises for the application of a complete manure on land which has been under the crop year after year, and the ploughing-in of a green crop when possible for the keeping of a sufficient supply of humus and nitrogen in the soil. Legumes were considered most suitable for the purpose, but as they serve to perpetuate nematodes, other green crops are resorted to and, amongst these, maize (broadcasted) provides, when ploughed in before reaching its maximum growth, a good supply of humus, the nitrogen being applied in concentrated form preferably before sowing the maize.

FRUITGROWING AT HERBERTON.

Mr. C. Harding, who is well known in horticultural circles in the North, has supplied the following notes on his twenty years' experience in fruitgrowing in the Herberton district:—

Locality: Three miles south from town of Herberton.

Temperature: As much as 16 to 18 degrees of frost, followed by a dry spring.

Soil: River flats. With the exception of grapes, no results were obtained until a liberal quantity of lime was applied. Trees blossomed, but the fruit did not set.

Grapes do well, both on the alluvial river flats and red volcanic soil. I suggest manuring with an artificial manure comprising 10 per cent. of potash. This is a great factor in producing a sweet grape. Varieties: Gotha, Ferdinand de Lesseps. These varieties were sent to the district twenty years ago by Mr. A. H. Benson. Many others do well, but the grower's object should be a grape that will stand transit and the thunderstorms. The Wilder Isobel and White Portugal are good main crop grapes.

Plums were shy bearers until the trees assimilated the lime, at first only bearing twenty to thirty fruit. The next year they bore from one to two hundred, while this year they are carrying up to two hundred dozen or more per tree. I strongly recommend the Kelsey—an exquisite and luscious fruit, readily saleable at 1s. per lb. Fruit weighing 6 oz. have been picked this season. Other varieties tried were Red Heart and Satsuma. They bear good crops of fruit, but from a quality point of view are not in it with the Kelsey. These are protected from the fruit-fly with netting.

Apricots are strongly recommended, especially all the early varieties including Moor Park and New Castle. The beauty of this fruit is that it matures before the fruit-fly becomes active, being ripe the second week in November, and no protection is required.

Pears are now being tried and will be a success. Those tried and now bearing heavily are Keifeers and Hybrid. The higher class of fruit is doing well.

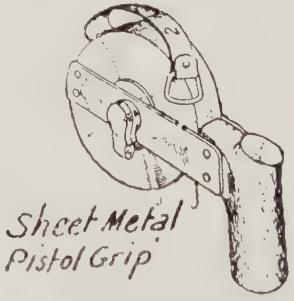
Persimmons do exceptionally well, and the trees are heavily laden every year. Both early and late Japanese varieties are recommended.

Two Pecan nut trees were sent to the locality twenty-five years ago by Mr. A. H. Benson; they are now 30 feet high and bearing good crops.

All trees should be given a liberal supply of water at the end of July and August. To be successful it is essential that trees be kept clean, and attention must be paid to the use of appropriate fertilisers. These remarks only apply to this particular locality. Growers must experiment and get varieties of fruit suitable to their localities. My experience will not allow me to recommend apples.

HANDY TAPE GRIP.

The tape commonly used by surveyors is hard to hold, especially when the hands are cold. The sketch shows a pistol grip that was cut from a tree branch. It measures about ¾ inch in diameter, and is attached to the reel case by means of



two strips of sheet metal, ⅝ inch wide. The strips are attached to the case by rivets, which pass through the rim of the case so that they are not in the way of the tape. Two rivets secure the strips to the handle. The grip is especially handy in unwinding or rolling the tape.

THE CARE OF THE CAR.

THE motor car battery consists essentially of a number of cells, three in the case of a 6-volt battery and six in the case of a 12-volt battery. These cells are usually contained in a common box, but each cell is a separate compartment from its neighbour.

Each cell has a non-metallic tank, usually a rubber compound. This cell contains a liquid known as the electrolyte and a number of positive and negative plates. The positive plates are connected to the positive terminal on the top of the cell and the negative to the negative terminal. The plates are made of specially cast lead that has been covered with special pastes of lead oxide. To understand the chemical actions in which these plates are involved, a knowledge of electro-chemistry would be required, which is something the average motorist does not possess, nor would it be of any great practical value to him if he did. The lead plates are so made that they present a large surface for the active material or paste to adhere to. The main constituent of the positive plate paste is red lead, while that of the negative plate is litharge. In the process of making the battery electric currents are passed through these plates but, ultimately, when the battery is supplied to the motorist it is fully charged and the positive plate presents a grey appearance (it has an outer layer of spongy lead), whereas the negative plate has a dark chocolate-brown appearance (its outer layer is of lead peroxide).

The electrolyte is sulphuric acid diluted with the purest of water, that is, distilled water. The strength of this solution of acid and water is of vital importance to the operation of the battery. Sulphuric acid is considerably heavier than water so that the strength of a mixture of the two may be judged by the weight of the mixture as compared with the weight of an equal quantity of water. This comparative figure is known as the specific gravity. Water is taken as the standard and thus if the specific gravity of a liquid be given as 1.5 then that liquid is 1½ times as heavy as water.

The specific gravity is measured by a simple instrument known as an hydrometer, which is really only a calibrated glass rod weighted at one end. When this rod is floated in a liquid the depth to which it will sink will depend upon the density of the liquid, so that it is a simple matter to calibrate the rod to measure specific gravity. Sulphuric acid consists of hydrogen and a combination of oxygen and sulphur, which is known as sulphate. Now when a battery is fully charged all the sulphatae is in the electrolyte, whereas when the battery discharges the sulphate is removed from the electrolyte and combines with the lead on th plates to form lead sulphate on both plates. When the battery is fully discharged all the sulphate is removed from the battery and the electrolyte becomes practically water.

Care of the Battery.

The plates of the battery should never be left for any length of time exposed to the atmosphere, and as the water in the electrolyte evaporates it must be made up from time to time or the plates will not be kept covered. Only distilled water should be used when making up the battery, and this distilled water should never be stored in a metallic container, as a trace of metal in the water will cause chemical actions in the battery, which will greatly shorten its life. The electrolyte level should be kept about an eighth of an inch above the tops of the plates.

A battery should never be left for any length of time discharged, as the lead sulphate on the plates forms into crystals, which will not disintegrate when an effort is made to recharge the battery. This happening is known as sulphation of the plates, and is a cause of the partial destruction of many batteries. Thus, if the driver knows that his battery is "flat" or nearly so, he should see to it that the battery is charged before the car is left idle for a few days.

Prolonged use of the starter when the engine will not start has a most injurious effect upon the battery, as the excessive current taken from the battery causes it to overheat and the plates are buckled. Also the sudden chemical action that occurs cracks up the lead sulphate and some of it drops to the bottom, where it is useless or possibly even a nuisance. If an engine does not start readily there is always some good reason for it, and it is a very poor driver who just keeps his foot on the starter and hopes for the best. The good driver only keeps the starter button pressed for three or four seconds, and if the engine has not then started, he will look for the cause of the trouble. When a battery is fully charged the hydrometer will register between 1.275 and 1.300, and the hydrometer reading should be checked when the distilled water is added. When the battery is discharged the hydromter reading will not be much more than 1.100. The number of times that a battery requires the

addition of distilled water varies with climatic conditions. As an example, in the hot, dry summers of the Western districts, the battery should be checked about once a week, whereas in cold weather, where the evaporation is very little, it is sufficient to check monthly.

The life of the battery depends very greatly upon the service to which it is subjected. As an example, the average country driver usually makes long trips, which means that the battery is charged for long periods, and that the starter is used but little. On the other hand, the city driver may use his starter very frequently, with the result that the battery is discharged much more rapidly than it is charged. When this is the case, the battery should be recharged at a service station periodically. It is well to remember that the acid used in the battery is remarkably corrosive, and will destroy any clothing it touches, and will burn the skin and even ruin the eyesight should any of it be splashed in the face.—RADIATOR in "The Farmer and Settler."

ABSTRACTS AND REVIEWS.

The Pig Breeders' Annual.

By a recent mail there came to hand the 1930-31 edition, Volume 10, of the Pig Breeders' Annual, published by the National Pig Breeders' Association, the largest and most representative stud pig-breeding society in Great Britain. Published in England and available to readers here at 3s. 6d., post free, the Annual represents excellent value, and should appeal equally to all who have an interest in pig breeding and feeding, no matter what breed they keep or in what country they reside. Breeding, feeding, management, marketing, and veterinary questions are dealt with by the most competent authorities, while the statistical section has been carfully revised and much valuable matter added. The illustrations of various breeds of pigs and of pigsty buildings and labour-saving appliances, together with the illustrated advertisements from a wide range of breeders, give to the volume added value from the point of view of the Australian farmer, while the reviews of pig breeding activities in various countries will be read with considerable interest by breeders anywhere.

The President of the Association this year is Major Clive Behrens, a prominent and successful farmer and an authority on all phases of the industry. The Foreword, by the Right Hon. Noel Buxton, M.P., late Minister of Agriculture and Fisheries, London, indicates the position of the pig industry in the Mother Country, and reviews the activities of different organisations specially interested in progress.

Articles of special interest to Australian breeders include, "The Future of Co-operative Bacon Factories in England," by David Black, Chairman of St. Edmundsbury Co-operative Bacon Factory, "Pig Prices," by Major E. R. Orme, of the Markets Division of the Ministry of Agriculture, "Common Ailments of Pigs," by Major C. G. Saunders, D.S.O., B.V.Sc., M.R.C.V.S., "Iodine in Pig Feeding," by Frank Ewart Corrie, B.Sc., M.D.A., N.D.D., "Litter Size, Is it Inherited?" by A. D. Buchanan Smith, M.A., M.S.A., B.Sc., of the Animal Breeding Research Department of the University of Edinburgh, "Observations of the Nutrition of Breeding Pigs," by those wellknown authorities, Dr. J. B. Orr, D.S.D., M.A., D.Sc., N.D.A., and H. R. Davidson, M.A., Department of Agriculture of the Rowett Research Institute, Aberdeen, "Empire Pork and Bacon," by E. H. Callow, Ph. D., B.Sc., A.I.C., "Experiences of Pig Testing in Scotland," "Dentition of Pigs," "The Work of the Harper-Adams Pig Feeding Experimental Station During 1929," "The Pig Industry and Young Farmers' Clubs," "Costs of Feeding on an Open Air Pig Farm," articles on "Pig Breeding Activities" in Sweden, in North America, in New Zealand, and "Pig Production as a Business," the latter by E. J. Shelton, B.D.A., of the Department of Agriculture and Stock, Brisbane, Queensland, Australia.

The volume is crammed full of useful facts and information of value to every farmer, and the Annual is worthy of a place in every library, and especially of those progressive farmers whose business it is to keep themselves abreast of the times and in touch with fellow breeders in every part of the world. The publication comes out under the general editorship of Mr. Alec Hobson, the Secretary of the National Pig Breeders' Association, a man of wide experience and unbounded enthusiasm. While the supply lasts, copies may be had on application to Mr. E. J. Shelton, B.D.A., Department of Agriculture and Stock, Brisbane, or from the Association's offices at 92 Gower street, London W.C.1, England.

The Young Farmer.

POINTS FOR CLUB MEMBERS.

Primary Essentials in Calf Feeding.

There are certain points to which too much importance can hardly be attached in the feeding of dairy calves. The first is the need for scrupulous cleanliness with the feeding vessels. The buckets should be scalded thoroughly every time they are used, and so also should any feeding apparatus used. The second is absolute regularity as to feeding time, and the third absolute uniformity as to temperature. Neglect of these last two points has more to do with calves' troubles than many farmers have any idea of.

A healthy regularity is likely to be promoted by feeding at the same time every day, while varying temperatures are obviously detrimental to the delicate and tender organs of the alimentary tract. Attention to the last is most necessary where a number of calves have to be fed or where the weather is particularly cold. Many very successful rearers of calves insist on having boiling water available during the whole time the calves are feeding, so that a little can be added as required to keep the milk ration up to blood heat.

As the calves grow they should be encouraged to eat as much roughage, such as hay or chaff, as possible. The effect is to develop the barrel and increase the capacity of the digestive organs for dealing with large quantities of food and turning it into milk. The development of the digestive organs can be begun with little difficulty while the animal is young, but it is practically impossible to modify the shape and conformation of a heifer that has been neglected up to the time she is, say, twelve months old.

Productivity of Dairy Cows—The Best by Test.

There is only one infallible judge of the productive capacity of dairy cows, and the wise dairy farmer refers for a verdict to the Babcock tester. There is too small a margin of profit in dairying nowadays to waste money and time in milking cows that do not yield sufficient to pay their way, or to take any risk in determining which come into this category.

Sheer human negligence perhaps is the main reason why farmers do not join a herd-recording unit, but there are still those who flatter themselves that they can tell what a cow produces merely on the animal's outward appearance, such as body formation, the size of the milk veins, and size and shape of the escutcheon. Judgments so based, however, have been repeatedly proved unsound, and the disparity between what the animal is estimated to produce and what she actually produces is frequently enormous. Valuable cows may as a consequence be got rid of, while fancy prices may, on the other hand, be paid for those not worth their salt.

There is one sufficient argument in favour of herd-recording—it pays. If it is used intelligently and systematically in conjunction with other means of herd improvement, the profit per cow can be very appreciably increased. Taking a dairy of forty cows, and estimating butter to the farmer at 1s. 6d. per lb., it will be seen that even a moderate increase in production per head has an appreciable effect on the farm income:—

Increase per cow.	Added farm income.
10 lb. butter	400 lb.—£30
20 lb. butter	800 lb.—£60
50 lb. butter	2,000 lb.—£150
120 lb. butter	4,800 lb.—£360

Every country in which dairying by modern methods is engaged in affords evidence of the benefits of herd-recording, but some striking enough figures are provided by our own farmers. Mr. E. P. Filmer, of Bimbaya (South Coast, New South Wales), recently furnished the information that as the result of eight or nine years' continuous recording he had been enabled to increase the average yield per cow from 180 lb. to just on 250 lb. of butter per annum, and this with a herd ranging from 95 to 100 head. A very simple calculation will show whether or not that improvement justified the expense of herd-recording, and the time and thought involved in the culling of the herd.

YOUNG FARMERS AT THE SHOW.

Twenty-five boys selected from the Schools Project Club of Queensland and ten representing the Junior Farmers' Clubs of New South Wales formed a farm boys' camp at the Exhibition Grounds, and thus was spent an instructive holiday at the Brisbane Show. Mr. T. L. Williams, who has been associated with the camp for three years on behalf of the Royal National Association, was again manager, and he had the valuable co-operation of Mr. G. M. Blacklock, manager of the Sydney contingent.

The lads were quartered on the grounds, and paid regular visits to different sections of the Exhibition. Several of the boys displayed a canny knowledge of cattle value, and largely anticipated the decisions of the judges with remarkable success.

In the John Reid hall the boys were taken in hand by Mr. M. P. Campbell, of the Chamber of Manufactures. Through the instrumentality of Mr. Campbell the Chamber of Manufactures had offered prizes of 30s. and 10s. for the best essay written by the boys of the Farm League on the exhibits in the John Reid hall. A similar prize had been offered by Messrs. C. F. Thompson and Co., bedding manufacturers, of South Brisbane, for an essay written by the boys on their particular exhibit.

Address by the Minister.

During a luncheon interval the boys were addressed by the Minister for Agriculture (Mr. H. F. Walker) on ideals of agriculture.

Mr. Walker said the lads had some hard work in front of them if they followed their avocations on the land, although those who worked hardest had the easiest time in the end. He said those on the land gained a freedom and independence of thought that was envied by those in other walks of life.

The Minister touched on many of the problems confronting primary producers, and said that in the early days some of the settlers worked and developed their land without much capital, and to-day were most prosperous.

"Queensland offers you great possibilities on the land," he added, "particularly in the Burnett areas, where cotton-growing is making rapid progress. We can grow tobacco here and save tremendous sums of money going out of the country each year. We also have wonderful opportunities of developing dairying and mixed farming, and following the splendid example last year, we can make a big increase in production."

The question of organised marketing was also explained to the lads, who were told that this would solve many of the farmers' problems.

The Boys.

Boys comprising the contingent included—Queensland:—Barrine, Charles B. Davis; Boonah Rural, Athol McLaughlin; Cloyna, Gordon Benson; Colinton, Anthony Peters; Eidsvold, Desmond Horn; Federal, Errol Head; Glencoe, Colin Storey; Gowrie Mountain, James A. Brimblecombe; Gundiah, Irwin White; Hatton Vale, Eric Knopke; Ideraway, Edward Gishford; Jarvisfield, Fred Ward; Jinghi Gully, Kenneth Sullivan; Killarney, Mervyn Hansen; Maleny, Harry P. Cranney; Mapleton, Ronald Pack; Mount Alford, Hector Stenzel; Palmwoods, Sidney Ramm; Peeramon, George Imrie; Pimpama Island, Roy Wonders; Taabinga Village, Raymond Woodall; Tannymorel, Cyril Bull; The Caves, John White; Winya, Donald Fogg; Yamsion, Albert Koehler.

New South Wales:—Dorrigo, T. Harvey; Glen Innes, R. Berman; Kempsey, William Daley; Quirindi, George Williams; Singleton, Malcolm Shearer; Tenterfield, William G. Foster; Armidale, Owen Wallis; Tamworth, George Cook and Jim Meadows; and Scone, Roy Goodworth.

A FUND OF INFORMATION.

A Proserpine farmer writes (19th August, 1930):—"I am a regular subscriber to the "Queensland Agricultural Journal," for the man on the land it is a fund of information."

Answers to Correspondents.

Rotted versus "Green" Cow Manure.

C. T. K. (Scarness)—

The Agricultural Chemist, Mr. J. C. Brünnich, advises:—The use of fresh cow manure or any excreta will encourage the growth of weeds. The farmyard manure properly prepared and matured by a process of fermentation and action of bacteria produces the plant foods in a better form, contains more nitrogen, and the vegetable matter is much more suitable for mixing with the soil, forming humus more readily, and encourages the growth of beneficial micro-organisms, &c. By the rotting process the vitality of the seeds is generally destroyed.

Roup.

J.A.L.S. (Barrine, N.Q.)—

From the symptoms described (combs turning black and a yellow discharge from the bird's throat), the disease appears to be a case of roup in one of its many forms. This disease could be prevented by keeping poultry under strict sanitary conditions, with ample ventilation, at the same time avoiding draughts, and with plenty of roosting space. A good germicide is obtained from the following mixture:—Dissolve 3 oz. of bluestone in a gallon of water. Dose: one cupful to each 4 gallons of drinking water daily. This germicide will prevent the disease from spreading from bird to bird through the medium of the drinking water.

Silage Requirements.

INQUIRER—

A herd of thirty cows will require 160 to 170 tons of silage if fed on it throughout the whole year.

A silo 12 feet diameter and 30 feet high will hold 68 tons; a silo 14 feet in diameter and 35 feet high will hold 117 tons.

It would require approximately 15 acres of green maize to fill the two.

Veterinary Questions Answered.

H.H.R. (Tumoulin, N.Q.)—

Mr. J. A. V. Rudd, of the Veterinary Staff, supplies the following answers:—

(1) *How soon after calving should a cow be washed out?*

If a cow calves normally there is no necessity to interfere with her in any way. As a matter of fact, she would be much better off if she was left alone.

(2) *When castrating a pig recently, after cutting through the first skin, a brownish, jelly-like substance appeared; then, when cutting the string of the testicle, I had to cut it away from a hard pus. What would these symptoms indicate?*

The jelly-like substance was serous exudate, the product of inflammatory action, probably due to the presence of pus near the testicle.

(3) *Some time ago five young cows died, apparently on their feet. There was no swelling. On opening them, I found that the entrails contained a little water. The cows passed much more liquid than solids. Do these symptoms indicate that the cows were poisoned, and, if so, could a bone analysis be made to determine the cause of death?*

The cows apparently died of arsenical poisoning. It is possible to find mineral poisoning if the intestines and their contents were subject to analysis. This is done in this Department by the Analytical Branch in Brisbane.

Wattle for Tanning.

F.A.T. (Nanango)—

The specimen of wattle is *Acacia glaucocarpa*, one of the feather-leafed wattles allied to those of the decurrens group which are the principal ones at present used in tanning. So far as analysis goes, the species you sent has generally given a fairly high tannin content (about 26 per cent). If you want to dispose of the bark, we would advise you to write to the Secretary, Master Tanners' Association, Brisbane.

General Notes.

Staff Changes and Appointments.

The following have been appointed members of the Southern District Stallion Board:—Major A. H. Cory, M.R.C.V.S. (Chairman), Messrs. Ernest Baynes, P. Short, and J. Sprott.

Constables H. H. Eiser and W. E. Lynam, stationed at Sapphire and Duchess respectively, have been appointed Inspectors of Slaughter-houses as from the 2nd August, 1930. The services of Mr. J. C. Pryde, Temporary Inspector of Stock at Coolangatta, have been continued from the 22nd July to the 2nd September, 1930.

The appointment of Mr. L. F. Mandelson as Assistant Pathologist has been confirmed as from the 1st January, 1930.

Acting Sergeant T. J. Peterson, stationed at Oxley, has been appointed an Inspector of Slaughter-houses as from the 26th July, and the Officer in Charge of Police at Yelarbon has been appointed an Acting Inspector of Stock as from the same date.

Mr. J. H. B. Goldie has been appointed Millowners' Representative on the Childers Local Sugar Cane Prices Board, vice Mr. C. R. Fletcher, resigned.

The following transfers of Cane Testers and Assistant Cane Testers have been approved:—

(*a*) *Cane Testers*:
Miss J. Orr, from North Eton Mill to Cattle Creek Mill;
Mr. J. C. D. Casey, from Cattle Creek Mill to North Eton Mill.

(*b*) *Assistant Cane Testers*:
Miss T. Payne, from North Eton Mill to Racecourse Mill;
Miss D. Bowder, from Millaquin Mill to Plane Creek Mill;
Miss R. Rowe, from Plane Creek Mill to Millaquin Mill.

His Excellency the Governor in Council has approved of the following appointments under "*The Banana Industry Protection Act of* 1929":—

Name.	Appointment.	Present Position or Address.
W. J. Ross	Chief Inspector	Senior Instructor in Fruit Culture
H. G. Crofts	Secretary (in acting capacity for six months)	Clerk, Head Office, Department of Agriculture and Stock
S. E. Stephens	Agent (in conjunction with present position)	Instructor in Fruit Culture
C. G. Williams	Agent	Inspector under Diseases in Plants Act
J. A. Stockdale	Agent	Inspector under Diseases in Plants Act
S. A. Green	Agent	Inspector under Diseases in Plants Act
D. McLaurin	Agent	Inspector under Diseases in Plants Act
K. King	Agent	Inspector under Diseases in Plants Act
E. L. V. Filer	Agent	Assistant Fruit Branch, Department Agriculture and Stock
P. Mitchell	Agent	Temporary Inspector Diseases in Plants Act
J. H. Mitchell	Agent	Temporary Inspector Diseases in Plants Act
E. L. Miles	Agent	Temporary Inspector Diseases in Plants Act
F. A. Drake	Agent	Experimental Station, Bartle Frere
C. N. Morgan	Agent	Goombungee, *via* Toowoomba
W. G. Hancock	Agent	Wellington Point
A. J. Browne	Agent	Gregory terrace, Brisbane
J. McG. Wills	Agent	Bauer street, Southport
L. L. S. Barr, B.Sc. Ag.	Agent	River terrace, Kangaroo Point

Of these appointments, those of Messrs. P. Mitchell, J. H. Mitchell, E. L. Miles, F. A. Drake, C. N. Morgan, W. G. Hancock, A. J. Browne, J. McG. Wills, and L. L. S. Barr will be on probation for a period of six months. Any of the appointees who already hold the position of Inspector under the Diseases in Plants Act and/or Inspector under the Pest Destroyers Act will continue to hold those positions as subsidiary to their new appointments.

Mr. J. G. Scholefield has been re-appointed Government Representative, and Messrs. J. A. Milson, J. R. Coghlan, N. Marlay, and H. H. Hamilton have been appointed Members on the Boulia Dingo Board.

Messrs. W. R. Burnett, D. Culhane, and T. Douglas, Inspectors of Stock, have been appointed also Inspectors of Brands, and Messrs. D. Culhane, T. Douglas, and H. J. D. McBean, Inspectors of Stock, have been appointed also Inspectors of Slaughter-houses.

Mr. J. R. Canty has been appointed a Temporary Inspector of Slaughter-houses for the period from 21st July to 31st August, 1930.

The following transfers of Inspectors of Slaughter-houses have been approved:—N. Custance, from Townsville to Warwick; N. Flanagan, from Bundaberg to Townsville; H. J. Walker, from Brisbane to Bundaberg; S. C. Smith, from Mareeba to Cairns; H. F. Sibley, from Charters Towers to Mareeba; A. Black, from Oxley to Charters Towers; and G. P. Randles, from Zillmere to Oxley.

Acting Sergeant W. Cook, stationed at Nanango, has been appointed an Inspector of Slaughter-houses. Mr. W. D. Lewis, Temporary Inspector under the Diseases in Plants Act, attached to the Departmental Picking-over Shed, has been appointed an Inspector, on probation, under the Diseases in Plants Act. The headquarters of Mr. J. N. Jones, Temporary Ranger under the Animals and Birds Acts, have been transferred from Mungindi to Miles.

Western Downs Dingo Board—Additional By-laws.

By-law No. 19 of the Western Downs Dingo Board has been approved. This by-law provides that the Board shall only grant one permit for dingo and marsupial destruction for every 5,000 acres of a holding. This by-law will be in force in the Western Downs Dingo District as from the date of Gazettal, that is, 9th August, 1930.

Levy for Banana Board.

An Order in Council under "*The Banana Industry Protection Act of* 1929" has been approved providing for a levy on all banana growers for the maintenance of the Banana Industry Protection Board. The assessment will be levied on growers of bananas at the rate of one penny halfpenny (1½d.) per case containing one and a-half bushels or less, and at the rate of one penny halfpenny (1½d.) per three busheds of cavendish, five bunches of lady's finger, or six bunches of sugar bananas. With respect to bananas marketed in Queensland the levy shall be collected by means of a deduction made by all commission agents, commodity boards, merchants, or other persons from proceeds of sales of bananas, the amount so accruing to be remitted by such commission agent, &c., to the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than the seventh day of each month in respect of all bananas sold or purchased during the preceding month. With respect to bananas marketed elsewhere than in Queensland the method of collection shall be by means of the Committee of Direction of Fruit Marketing or the Commissioner of Railways adding the sum of 2s. 10d. (two shillings and tenpence) per ton to the freight charges on such bananas, such amounts collected to be remitted as above. This assessment will come into operation on the 2nd August, 1930.

Levy for Maintenance of Banana Experimental Stations.

An Order in Council under "*The Primary Produce Experiment Stations Act of* 1927," has been approved providing for a levy on growers of bananas for the maintenance of the Banana Experiment Stations at Kin Kin East and Bartle Frere. The assessment will be levied on growers of bananas at the rate of three farthings (¾d.) per case containing one and a-half bushels of bananas or less, and at the rate of three farthings (¾d.) per three bunches of cavendish, five bunches of lady's finger, or six bunches of sugar bananas. With respect to bananas marketed in Queensland the method of collection shall be by means of a deduction to be made by all commission agents, merchants, commodity boards, or other persons from proceeds of sales of bananas, the amount so accruing to be remitted by such commission agent, &c., to the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than the seventh day of each month in respect of all bananas sold or purchased during the preceding month. With respect to bananas marketed elsewhere than in Queensland the method of collection shall be by means of the Committee of Direction of Fruit Marketing or the Commissioner for Railways adding the sum of one shilling and fivepence (1s. 5d.) per ton to the freight charges on such bananas, remittance to be made as above.

Cheese Board Election.

The result of the voting in connection with the election of five growers' representatives on the Cheese Board was as follows:—

Division No. 1—
Thomas Dare (Narko) .. .. 89 votes
Gilbert Julius White (Maclagan) .. .. 58 votes
David William French (Sunnyvale, Bell) .. .. 28 votes

Division No. 2—
Henry Thomas Anderson (Biddeston, Oakey) .. .. .. 135 votes
William Thomas Harris (Toowoomba) .. .. 46 votes

Division No. 3—
Alfred John Harvey (Pittsworth)—Returned unopposed.

Division No. 4—
David Gabriel O'Shea (Southbrook) .. .. 108 votes
Albert George Tilley (Rosehill) .. .. 60 votes
George Burton (Cambooya) .. .. 34 votes

Division No. 5—
Arthur Pearce (Coalstoun Lakes)—Returned unopposed.

Messrs. Dare, Anderson, Harvey, O'Shea, and Pearce will therefore be appointed for a term of three years as from the 1st August.

Peanut Board Referendum and Election.

The question of the constitution of a Peanut Board to deal with all peanuts grown for sale, instead of from one half an acre and upwards as at present, was submitted to peanut growers and the following is the result:—

For .. .. 346 votes
Against .. .. 62 votes

The election of members to the Board for the respective districts was also carried out at the same time with the following results:—

	Votes.
District No. 1 (Wienholt and Nanango).—	
Frederick Christian Petersen (Kingaroy)	165
Charles Frederick Adermann (Wooroolin)	157
John Wesley Johnston (Wooroolin)	110
District No. 2 (Central Queensland).—	
Alfred Skinner Clark (Sandhills)	57 votes
Reuben Johnson (The Caves)	39 votes
District No. 3 (Rest of Queensland).—	
Albert George Whiting (Atherton)	46 votes
Albert Charles Perske (Degilbo)	31 votes

The necessary steps will be taken for the constitution of the new Board as from the 1st September, and the appointment of members thereto from that date.

Messrs. Petersen and Whiting will hold office for a term of two years, and Messrs. Adermann and Clark for one year.

Marketing of Tomatoes.

On the 31st July the Committee of Direction issued a Tomato Direction, to come into operation as from the 15th September to the 15th December, 1930. Petitions have now been received from various districts asking that an Order in Council be issued by the Governor in Council declaring that the tomatoes to which the direction relates shall be acquired by the Committee of Direction as the owners thereof. The tomatoes to which the direction relates will be all tomatoes grown for sale from the 15th September, 1930, to the 15th December, 1930, in the district from Nambour in the north to the New South Wales border in the south, to Rosewood in the west and the Pacific Ocean in the east, including the islands in Moreton Bay. A Regulation (No. 199 under the Fruit Marketing Organisation Acts) has now been issued to govern the poll to decide whether or not the Order in Council giving the Committee of Direction the power to acquire the tomatoes shall be issued.

The Committee of Direction is to conduct the poll, and all voting papers must be returned so as to reach the Committee of Direction not later than the 30th August, 1930, at noon. All persons in the district concerned who are growing tomatoes for sale on a wholesale basis will be eligible to vote, and, to insure their names being on the roll, growers are invited to send their names and addresses at once to the Committee of Direction of Fruit Marketing, Turbot street, Brisbane. The Committee of Direction is compiling the roll of persons eligible to vote from various sources of information, and the name of any person who satisfies the Committee of Direction that he is a "grower concerned" will be inserted on such roll.

Sugar Levies for 1930 Season.

Regulations have been passed under the Primary Producers' Organisation and Marketing Acts providing for levies on growers of cane in Queensland for 1930. There are levies providing for a Defence Fund, and for the administrative purposes of the Queensland Growers' Council, District Canegrowers' Executives, and Mill Suppliers' Committees, &c. Full particulars of these levies will be supplied to-morrow.

Extension of Operations of Cheese Board.

The present Cheese Pool was constituted in 1927 for a period of three years ending on the 31st July, 1930. By an Order in Council dated the 29th May, 1930, the Governor in Council gave notice that it was his intention to extend the duration of the Board for a further three years until the 31st July, 1933, and that he would receive, on or before the 30th June, 1930, a petition for a poll to decide whether or not the Board should be extended as intimated. As no petition was lodged, a poll was unnecessary, and an Order in Council has now been passed extending the operations of the Cheese Board for a period of three years as from the 1st August, 1930—that is, until the 31st July, 1933.

Angora Rabbits.

The Minister for Agriculture and Stock (Mr. H. F. Walker) has received further information through the Queensland Agent-General in Great Britain, which should be of interest to those persons who have taken up the breeding of Angora rabbits in this State.

The information furnished shows a somewhat better demand for first grade wool, and the price for this quality has risen 3s. or 4s. per lb., the current quotation being 28s. per lb.

The following price list is issued by the leading firm of spinners dealing with this commodity:—

Angora Rabbit Wool.

Extra super	28s. per lb.
Firsts	24s. per lb.
Seconds	17s. to 20s. per lb.
Thirds and matts	7s. 6d. to 10s. per lb.

Delivered at mill.

However, it is pointed out that possibly only the production of the very best wool would be profitable to Queenslanders, as consideration must be given to the incidental and other costs involved in export to such a distant market.

Buzacotts—A Successful Year.

Read at the annual meeting of the shareholders of Buzacotts (Queensland) Limited, machinery merchants, Brisbane, the directors' report stated that, notwithstanding the very difficult conditions which prevailed, particularly during the latter part of the year, turnover had been maintained, and the position of the company, both financially and otherwise, had shown an improvement. In the course of the year several new agency lines had been added to the company's already long list. Chief amongst these were the Howard Jnr. Rotary Hoe and Lightning Fruit Graders and Ethylene Gas. The reception of the Howard Jnr. Rotary Hoe by practical men had been most encouraging, and sales had reached a very high figure. The machine was instrumental in considerably lowering production cost, and its success in this respect can easily be gauged from the excellent results obtained by owners.

A large number of Lightning Graders had been sold and progressive growers were very keen on the introduction of Ethylene Gas, particularly for the colouring of mature citrus fruit. It was well known that in some localities the fruit, although actually mature and with the right sugar content, did not colour properly, and Ethylene here was indispensable. Cases were cited of the price of fruit increasing by at least 5s. per case after treatment with Ethylene Gas.

In moving the adoption of the report and balance sheet, the chairman (Mr. E. W. Buzacott) stated that he was confident that the shareholders would be pleased to see that the company had maintained its position and that the rate of dividend was to be the same as last year. He informed the meeting that the removal of the business to the company's own premises in Petrie Bight, next to Atcherley House, had been completed, and that the business had greatly benefited by this move. He stated that it was the unanimous wish of the board that there be placed on record their appreciation of the services rendered to the company by the entire staff under the capable management of Mr. R. D. Huish. The retiring directors, Messrs. E. W. Buzacott (Chairman), R. D. Huish (Managing Director), Alderman A. Watson, Messrs. F. G. Carr and F. W. Hiscox were re-elected on a unanimous vote.

The Home and the Garden.

OUR BABIES.

Under this heading a series of short articles by the Medical and Nursing Staff of the Queensland Baby Clinics, dealing with the welfare and care of babies, has been planned in the hope of maintaining their health, increasing their happiness, and decreasing the number of avoidable cases of infant mortality.

THE PREMATURE BABY.

Did you know that during 1929 853 babies under twelve months in age died in Queensland? Of these deaths that took place during the first year more than half occurred during the first month of life. A large number of these children were premature or else were feeble, weakly infants who should have received the same treatment as those who were premature.

If even half of the premature babies who are born each year in Queensland could survive, the much desired result would be a marked lowering of the infantile mortality rate. While most people know that when a baby is premature it needs special care and treatment, many have little knowledge of the special points which require immediate attention if the child is to have a reasonable chance of survival. Such babies when born in a locality where there is a baby clinic should be at once brought under the notice of the clinic nurse, who is always willing to advise the mother or to help her in carrying out the doctor's directions in the care of these cases. For the mother in the country where clinics and welfare nurses are not available the following directions may be useful:—

If a baby is under 5 lb. in weight when born it is better to treat it as premature to get satisfactory results. But even those who weigh so little as only 2 or 3 lb. can often live and develop into strong, healthy children if the necessary care be taken.

In appearance the premature differs from the normal baby in more than size. The little body is very soft and limp, the skin wrinkled, downy, and redder than usual. The infant is very weak and often too feeble to suck. The cry is feeble and suggestive of the mewing of a young kitten. Often the baby cannot cry at all.

There are four points which must receive immediate attention. They are—(*a*) Prevention of chilling (this is most important and must be the first consideration) (*b*) careful feeding with mother's milk; (*c*) careful avoidance of infection; and (*d*) avoidance of unnecessary handling .

Prevention of Chiling.

Because the baby has come too soon into the world it chills very quickly. A premature baby who is allowed to become thoroughly chilled soon after birth rarely lives. Therefore, when we know that an infant is to be born prematurely, special care should be taken to prevent this chilling. A small cot should be prepared, and by means of hot bottles thoroughly warmed. Baby must not be bathed nor even oiled at first. As soon as it is born wrap it in warmed cotton wool or soft flannel and place it in the warm cot. Six or eight hours later, if the child is then thoroughly warm, oil it with warm olive oil, using cotton wool swabs. Do this as quickly as possible, uncovering only a portion (say one arm or leg) at a time, and also taking care to move or handle the baby as little as you can. Very small babies should be oiled without being lifted from their cots, which should be screened from draughts while it is being done. In hospitals cots are specially prepared for such babies, but special cots are not essential, and a very satisfactory and comfortable bed for the "prem." can be quickly improvised. Half of an old-fashioned "dress basket" does splendidly, and failing this the family clothes basket or a box can be used. To prepare the improvised cot first line it with either brown paper or newspaper; this is to prevent the escape of heat. After this, and for the same reason, line the inside with blanket. A strip of old blanket or a wide woollen scarf can be used. To fix this place it first outside the basket so that it reaches from top edge to bottom, and fasten it securely either with a string tied all the way round or by sewing through the blanket and basket at intervals. Having done this turn the blanket over inside the basket so that

it is completely lined and also has a tidy top edge. Now throw a single blanket over the cot; it should not reach quite to the head of the basket. Place a thin firm pillow in the bottom and a soft one over it to form a mattress. A flannelette napkin will serve as a sheet, and a small folded fine towel as a pillow. At first a mackintosh may not be necessary, but later must be provided. Into this warmed cot baby is placed, wrapped in his cottonwool jacket, and covered with a soft shawl. Place a small light blanket over, letting it lie loosely on the child, and then draw the sides of the enveloping blanket across the cot and tuck them in. But this is not enough. Premature babies chill so easily that more warmth is required, and this is supplied by hot water bags or bottles. Rubber bags are best, but if they are not available stone gingerbeer or ink bottles will serve. In cold weather three are required—one at the foot and one at each side. One bag is placed between the two pillows at the foot of the bed; the others lie, not against baby's body, but tucked down at the side between the enveloping blanket and the mattress. For the bottle at the foot of the bed use two-thirds boiling water and one-third cold water; for the side bottles use equal parts cold and boiling water. These require to be refilled, one every hour in rotation, in winter. In summer two bags are usually sufficient once baby is thoroughly warm, and they do not need changing so often.

Give baby plenty of fresh air. Keep him in a well-ventilated room. In our Queensland climate the air, even in winter, is not cold enough to hurt the premature baby provided his bed is kept properly warm. Guard against overheating. It is wise to have a dairy thermometer in the bed, and this should register between 85 and 95 degrees Fahr. Gradually decrease the artificial heat as baby's strength improves. Oil him every second day, taking the same precautions as for the first oiling. Do not put him in the bath until he weighs 5 lb. As he improves commence with sponging, at first only face and hands, and gradually increase until he is being fully sponged, and later bathed.

Feeding is Very Important.

The healthy, normal baby thrives best if fed on his mother's milk. For the premature baby natural feeding is even more necessary; in fact, few survive without it. Though the baby may live and thrive on an artificial food, he is much more likely to do so if he is fed on his mother's milk, and failing this the milk of another healthy mother is the best thing. Sometimes a relative can be found who has a healthy baby of her own, and so is able to act as foster mother. It does not matter if the foster mother's baby is some months old; the milk will not hurt the premature baby on that account, though it may be necessary to dilute it perhaps to half strength at first. If there is any doubt as to the health of the foster mother until a test can be made, or the opinion of a doctor obtained, do not put the child to the breast, but feed from a spoon, and always boil the milk before it is given to the baby. If only a small amount of breast milk is available from either mother or foster mother give that first to the baby, and then make up to the full requirement with the artificial food. It will not do any harm to give the two foods in this way; in fact, the small quantity of mother's milk will help baby to digest the artificial food.

If breast milk is unprocurable, artificial feeding must be tried. Whey, which is easily digested, can be useful at first, and the child graded later to the following whey-milk mixture:—

Scalded milk, 2 oz. (4 tablespoonfuls);
Scalded whey, 2 oz. (4 tablespoonfuls);
Boiled water, 1 oz. (2 tablespoonfuls);
Sugar of milk, 2½ flat teaspoonfuls not pressed down;

or condensed milk can be tried, and if this is used a strength of one teaspoonful of condensed milk to twenty-four teaspoonfuls of water can be used to begin with. The condensed milk should always be poured from the container to the spoon in measuring. Very gradually, as the child improves, the strength can be increased to one teaspoonful of condensed milk to eight teaspoonfuls of water.

Nothing but boiled water should be given to the premature baby for the first twelve hours, but after that it must have food. It is impossible to say how much the child should have at a feed. Some of these infants are able to suck the breast and obtain all they need with three-hourly feeding. Others are quite unable to suck, and at first almost unable to swallow. Such cases must be fed with a pipette or eye-dropper, and if able to take only very little (perhaps only one or two teaspoonfuls) must be fed, at first, perhaps every hour with one interval, at night, of three hours. With a feeble baby it may take as long as half an hour to give it this small quantity. As soon as the baby can take a larger amount gradually increase the interval between the feeds (by a quarter of an hour at a time) to three hours, with one five-hour

interval at night. Also substitute a small feeding-bottle for the eye-dropper as soon as the child shows signs of sucking. While baby is too feeble to suck the breast the mother's milk must be expressed, either by hand or the breast pump, every three hours during the day, so that the supply may be kept up. As the child's strength increases it may be put to the breast, at first for five minutes twice daily, and the feeding finished from the bottle. A rough estimate of the amount of food that a premature baby should take is 3 oz. for each 1 lb. of body weight. Thus, if a baby weighs 3 lb., try to give him 9 oz. of food daily. So if he is fed nine times daily endeavour to give him 1 oz. each time. He may take much less at first.

Prevention of Infection.

As a result of being undeveloped and weak, baby is very susceptible to infection. Because he is so tiny he is generally an object of interest and curiosity to neighbours and friends who come to visit him. In his interest this should not be allowed. Even a common cold in and attendant or visitor can easily lead to a fatal pneumonia in a premature baby. For this reason isolate him as far as possible; have no unnecessary visitors and as few attendants as can be. If mother or nurse develops a cold she should tie a piece of gauze over her nose and mouth while attending to the child.

Avoidance of Handling.

Handling is very harmful to the feeble premature baby. Until he shows signs of increasing strength do not remove him from his cot while feeding or oiling him. Handle as little and as gently as possible while changing him. But change of position is necessary; turn him from one side to the other every four hours.

The care of a frail premature baby entails not only much care and trouble, but a high degree of skill. The successful rearing of such an infant is justly a source of pride to mother or nurse.

LADY STONEHAVEN'S MESSAGE.

Before leaving Brisbane on her homeward journey, Her Excellency, Lady Stonehaven, issued the following farewell message to the women of Australia:—

"The women of Australia have built up in the past great traditions and upheld noble ideals. They, equally with the men, were the pioneers in this great country. They lit the torch—and it remains with the women of to-day to keep the flame alive. The old noble traditions and ideals must be firmly upheld and maintained. The same spirit with which the women of Australia gave their husbands, brothers, and sons for the war animates the women of Australia to-day—the spirit to endure hardships and sorrows with a brave face, to overcome difficulties with a smile, to give up much, and to help their mankind to face adversities with bravery and perseverance. Patience and courage will be needed even more in the future, for the trials of peace make as great demands as do the stress and tribulation of war.

"I am quite confident that the women of Australia will respond to the call, and will uphold once more the honour of Australia, and win the respect of the world.

"It is an oft-repeated truism that we are facing hard times; but if those hard times are faced with courage and self-denial they will pass, and we shall all be better and happier for having overcome them. Having lived amongst the women of Australia for five years (and five very happy years) I am absolutely confident that their courage, patience, and real effort will carry them through these hard times. May I wish them, their husbands, brothers, and sons, from the bottom of my heart, God's blessing."

FLOWER GARDEN.

The flower garden will now be showing the result of the care bestowed upon it during the past two months. The principal work to be done this month is the raking and stirring of the beds, staking, shading, and watering. Annuals may be sown as directed for last month. Plant tuberose, crinum, ismene, amaryllis, pancratium, hermocallis, hippeastrum, dahlias, &c. Water seedlings well after planting, and shade for a few days. Roses should now be in full bloom. Keep free from aphis, and cut off all spent flowers. Get the lawn-mower out and keep the grass down. Hoe the borders well, and trim the grass edges.

THE ART OF ROSE CULTURE.

By G. H. HEERS (Department of Agriculture and Stock).

In a Lecture at the June Show of the Wynnum and Manly School of Arts Horticultural Society.

THE art of Rosiculture is romantic, full of disappointments and surprises, intermingled with wonderful discoveries which make it so fascinating.

I have great faith in Queensland generally, and, as a rose-growing country, I know of no place so favourably served from the point of climate and natural conditions. You may plant, bud, and flower a rose every day throughout the entire year. In what other country can this be done? In the matter of propagation, we can accomplish in a few months that which is most countries would take years to do. Hundreds of new varieties are raised annually in Great Britain, America, and other parts much less favourably situated, and actually imported to this country every year, instead of which we should be supplying the world's requirements in this direction.

In view of these facts, I propose to deal with the subject in a general way, yet keeping in mind any matter which would tend to instil in every rose enthusiast the desire for further knowledge of the rose, so that he may be encouraged to try his hand at raising new varieties, which after all is very simple.

In addition to the desirability of raising our own new sorts, this aspect of rose culture is undoubtedly the most fascinating of all its phases. Nature has provided the conditions, and all that is wanted is the will and the way. In order that you may more readily grasp the position, I propose to traverse very briefly the origin of the rose. This may not be popular with some of my listeners, but to build on a proper foundation it is necessary to show what things have already been achieved and how easy it will be to follow up this important work. It must be remembered that various species that will be briefly touched on cannot be compared with our present-day creations. Indeed, even at the present rate, it is difficult to foresee what standard of perfection will eventually be reached.

The Queen of Flowers.

The origin of the rose is somewhat conflicting. It is on record that even as far back as 600 B.C. Sappho sang—

"Would Jove appoint some flower to reign
In matchless beauty on the plain,
The Rose, mankind will all agree,
The Rose, The Queen of Flowers should be."

That position has never once been seriously disputed, and the rose still stands secure. From Homer to Tennyson and so on to-day, every poet, songster, and artist has always seized upon the rose in the embellishment of his art.

There are many species of wild roses, mostly originating in Asia, South and Central Europe, and North America. Although these are practically unknown in Queensland, in America sixty-eight species of wild roses are still catalogued. With these were produced the early Hybrids, Austrian Briar, Bengall, Rugosa, Sweetbriar, Damask, Cabbage, Multiflora, &c. One thing is certain—to-day's great ever-bloomers owe their existence to these wild flowers, plus, of course, man's handiwork.

English history shows that in the 14th century she had the "Wars of the Roses," when the combatants each chose a rose for their emblem, proving conclusively its popularity even in those days.

Some History.

In 1596, Austrian Copper, a highly coloured variety, was originated. Though this had always been admired for its colour and perfume, it was left for that noted French rosarian and hybridist, Pernet Ducher, to exploit this rose with a view to transmitting some of its richness and perfume into our modern roses. The result has been the creation of that wonderful strain of beautifully coloured roses known as "Pernetianas," so popular in most parts of the world, though unfortunately few of them thrive in this portion of Queensland. In 1778, a Cabbage rose (*Rosa Centifolia*) "Unique Blanche" was raised by Grimwood. Though there are early records of the Tea rose in India, Persia, and China, the date of its arrival in England is not clear, but it receives mention in 1810 and Hybrid Perpetuals in 1812. With these the work of hybridisation commenced in England, crossing and recrossing them with Hybrid China, Damask, Provence, and Bourbons. The Damask with its rich scent having been brought from the Orient by the Crusaders, its peculiar

fragrance is to-day still intact in such roses as Geo. Dickson, General McArthur, &c. The first record of the Hybrid Tea Class, a cross between the T. and H.P., so far as I am able to find, was when that quite good rose, "Adam," was originated in 1838. This rose, I might say, is still to be found growing well in the Brisbane Botanic Gardens, and also in Wynnum. Other notable early productions were Prince Camille de Rohan, H.P. in 1861, and La France, H.T. in 1867, both being still with us to-day. I forgot to mention that in 1820 Champney created the Noisette type by crossing T.'s with the China Musk. In 1878 what is known as Crimson Rambler was raised in Japan, its original name being "Shi Tz Mu" (meaning Seven Sisters). This rose was brought to England in 1890, and it is said that the great rosarian of the day, Charles Turner, made a fortune by disseminating it under the name of "Crimson Rambler," so that you will see that America is not the only country where that kind of thing has been done. Of course, the American never does things by halves. For instance, that well-known and very common rose, W. R. Smith, has now been sent out in that country under six different names, each description being an exaggeration on the previous one. Even some of our own people who should know better seem to think it sounds better to call F. K. Druschki, Snow Queen, and so on. No rosarian of any note would dream of such a thing, because he understands the circumstances under which they were named, and no individual is entitled to undermine such associations. Especially is this distasteful when after years of work, the raiser, no matter what his nationality, has bestowed an honour on someone near and dear to him. If you object to the name, be consistent and refuse to grow the rose.

The Work of the Plant Breeder.

Although the English hybridist has accomplished wonders, it is said that he has never set about breeding with any definite object, just crossing and recrossing any old way. The result has been that may English roses lack growth. However, it must not be overlooked that though these roses may not suit us in Australia, they may be quite good under pot culture. There are quite a number of hybridists in various parts of the world who have been breeding along defined lines, Pernet Ducher, Dr. Van Fleet, Peter Lambert, M. H. Walsh, and our own Alister Clark, of Glenara, Victoria, at whose wonderful home I had the pleasure of spending last Anzac Day, and oh, what a day! Mr. Clark is a gentleman who grows roses not for profit but for the love of them. He has growing many hundreds of distinct seedlings of his own raising, which when tested are usually sold for the benefit of some Horticultural or Rose Society. Mr. Clark has a firm conviction that by working crosses with "Gigantea," he hopes ultimately to produce a rose which will be proof against mildew. I was shown a gigantic plant of this species twenty-seven years old, stem 25 inches thick, and branches 36 feet long. Two or Mr. Clark's roses which are popular and doing well in Queensland are Sunny South and Blackboy. I believe that I have persuaded Mr. Clark to give us in future an opportunity of testing some of his fuller types of roses which fail to open in Victoria but which may prove suitable for our conditions. I believe Mr. Clark to be thoroughly Australian, and should the opportunity arise, I am sure Queensland will also benefit by his generosity. The other plant breeders mentioned have also made definite progress along given channels, each working on different types.

Climbers.

Altogether it is estimated that there are 12,500 varieties represented by the following types:—H.P., H.T., T., Bourbon, Polyantha, Wichuraiana, Banksia, Noisette, and the numerous climbing sports. In regard to these climbing sports, I would like to point out one aspect which is not well understood. After purchasing a climber it sometimes fails to climb and the nurseryman concerned is immediately assailed as having taken one down. Now this is often quite a wrong attitude, as no reliable propagator would think of working from anything but true climbing wood; and, further, would not send it out as a climber if it had not by then shown climbing form in the nursery. The trouble is few people understand that the original stem sent out by the nurseryman never becomes part of the future plant. This portion always dies and new growth coming from the impregnated portion near the base, which by the way may revert to the original dwarf, commences to bloom and forms the foundation of the tree to be. In proof of this theory, I ask you to look at any rose planted in your garden last year, when you will discover that that portion with the nurseryman's label attached is quite useless and should have long since been removed. For this reason, I favour a plant with only a single stem. In fact, if people only knew, the better plant is the one where the bud is still dormant, as then there is nothing to cut away, the process of which frequently causes disfigurement and even abnormal growths to form on the stem. The briar having been impregnated with the true climbing strain in the process of budding, it is possible by removing every portion of the dwarf growth to sometimes force it to produce the climbing

wood, though years may have elapsed since it was originally worked. Moving the plant to another location, sometimes automatically results in the change taking place.

The Rose in the Garden.

I am one of those who believe that the rose responds to man's sympathy. In fact, it has many peculiarities often found in the makeup of woman—always refined, attractive, and beautiful, appreciates attention and even admiration, in return for which it will give of its best. The rose is also mighty jealous and to a degree selfish. It resents the company of other flowers, wants your undivided attention and certainly excels wherever these conditions prevail. I always recommend that roses should be planted in a bed by themselves, this to occupy the premier position in the garden.

While roses will give good results under almost any condition, soils and their preparation and the natural situation mean much to their real success. I recommend trenching as a general rule, always being careful that the lowest portion of your bed will not act like a dam and hold water. On flat or ground that does not lend itself to trenching, it is better to raise the bed. In such event the earth should be enclosed with a wooden or concrete border. Roses should not be planted near the edges of raised beds, owing to the tendency of drying out.

The Troubles of the Novice.

Many thousands of roses are lost annually through misplaced kindness. I particularly refer to the general tendency of placing artificial fertilisers and fresh manures in the holes at the time of planting young roses. You would never think of giving a newly babe a beef steak. When thoroughly established the rose is a greedy feeder and will take almost any quantity of fertiliser or manure if properly rationed. I once heard a very eminent authority say that there were three things which you could not overfeed—the hog, the rose, and a man.

Colour and Scent.

It is estimated that there have been determined as many as 365 colour variations in roses. Perfumes also are surprisingly numerous and quaint. In 1886 the Horticultural Press of Philadelphia set out to identify perfumes, and in that year decided on Peach, Melon, Violets, Pinks, Raspberry, Hyacinth, and Apricot. Mr. H. R. Darlington and Rev. J. H. Pemberton, two noted English authorities, later added Russian Leather, Pear, Hay, Alcohol, Apple, Prune, Wine, Musk, Damask, Tea, and Fruit, and I think with the advent of the new white rose "Caledonia" out this year, I recognise yet another scent, that of Honey. Tea scent is mostly associated with lighter shades, Lady Hillingdon being an example, Damask in Geo. Dickson, General McArthur, and Radiance, whilst that of Fruit is very strongly found in Rev. F. Page Roberts.

Terms of form are expressed as Globular (Geo. Dickson), Flat (Malmaison), High centred (K. A. Viktoria and Mrs. Geo. Shawyer), Cup (Caroline Testout and Star of Queensland), Reflexed (J. J. L. Mock), also Imbricated, Ovoid, Cabbage, &c.

Types of Plants.

There is some confusion about types of plants, particularly regarding standards. True standards are seldom seen in Queensland, and I shall have more to say about this directly. (With the aid of specimen plants and a blackboard, Mr. Heers here explained the difference between a Standard which is worked some 3 feet or so from the ground on a briar stem, whilst Bush roses were those which were generally called dwarfs and which were worked—i.e., budded, on short stems, say, 4 to 5 inches from the root system, which when correctly planted would be level or just below the surface of the ground. Mr. Heers here showed a plant purchased at a department store which was budded on a stem about 10 inches long, and described it as useless, as there was no way in which such a plant could be correctly planted.)

Reverting again to the question of standards, it is the general belief that the sun is too hot in Brisbane for this class of rose. It is thought that the heat deleteriously affects the long exposed stem or trunk of the bush. If this were so, how is it that standards do particularly well in the central western portion of Queensland, where the sun is much hotter than in Brisbane It would appear that there are other reasons and, personally, I have seen excellent specimens here of strong growing types on "Rosa Odorata" and the weaker kinds quite good on "Fortunii." It is well known that standards from the South are worked on South Australian Dog Rose "Rosa Canina." This has a very shallow rooting system, which may have something to do with its unsuitability for Queensland. I am, therefore, of the opinion that a good deal has to do with the understock.

Whilst on the question of Understock, I might say that so far I favour "Rosa Odorata" for general use in Queensland. The same thing is used in the Southern States but is known under different names. In New South Wales it is called "American Noisette," Victoria "Maiden's Blush," South Australia "Boursault," and in Queensland it is also known as "Manetti." It was reported that at a lecture recently given at the Albert Hill, Brisbane, I favoured "Rosa Multiflora" as an understock. What I actually said was that in New South Wales this briar was becoming more and more popular and that some nurserymen were changing over to it entirely. I mentioned that it was undoubtedly an advantage to work Pernetianas on "Multiflora" and that in view of the fact that this blood was predominant in most of our newer roses, the time may come when we might have to seriously consider the advisability of also making the change. (Here Mr. Heers showed a number of understock in their various stages of preparation and growth from the naked cutting on to the young plant ready for planting out. With the aid of specimens the good and bad points were demonstrated, the speaker maintaining that the proper preparation of the cutting was important and unless the "heel" was so prepared to force an even callus, the rooting would not be symmetrical, upon which greatly depended the very foundation of a good plant.)

Failures Should be Negligible.

Provided that you have been supplied with the right class of plant and plant as directed at the right time, failures should be negligible, as the rose is hardy and easy to transplant. Failures can generally be attributed to one or more of the following causes:—Having used fresh manures or fertilisers at the time of planting, allowing roots to be exposed to the sun or wind, excessive wet weather, sodden ground, planting near shrubs, trees, hedges, and in shady positions, westerlies, heavy frosts, planting too shallow or too deep, or when placing the plant in the same position where a rose formerly grew without first replacing the entire soil, plants being knocked by children, dogs, or the careless gardener. The most common fault, however, is early planting. I have in and out of season preached the advantages of late-planting for Queensland, and can now definitely say that as a result quite a large number of growers who have followed my advice inform me that they have obtained wonderful results. It is inconceivable that in our climate, where roses are in full bloom and full of succulent growth as they are during the March, April, May, and early June period, the plant is in a fit state to lift. Then owing to the short intervals of warm weather during winter, which are certain in Queensland, the plants are encouraged to make premature growth which is cut down when frosty or westerly weather appears, as it assuredly does during our mid and late winter months. Remember if these same plants were left in the nursery undisturbed, they would not attempt to put forth growth, and in consequence if left till the winter is just about finished, the plants when transplanted simply jump away and never look back. I have thoroughly tested for the best time to plant, and as a result strongly recommend from August till the middle of September, and have no hesitation in stating that May and June, along with November, December, and January, are the very worst months of the year for planting roses in this country. I have always said that early planting may be quite alright in the Southern States, but very recently it was confided to me by leading authorities in both Victoria and New South Wales that the heavy losses occurring in those States in recent years are probably due to early planting. I am in possession of facts where already this year several lots of one dozen and more have completely gone west, due entirely to this stupid fad of early planting.

Pruning.

I take up the same attitude regarding pruning. August is in my opinion the best time to prune. Pruning is a difficult thing to give oral advice upon. If the blooms are always taken with long stems and any dead and spindled wood removed from day to day, the general overhaul is made comparatively easy. (By the use of the blackboard, Mr. Heers demonstrated some of the most important points. For instance, text-books always advised that the top eye should be pointing outward. This, he said, was quite correct for all tall and upright growers, but was all wrong when the spreading varieties such as Medea were being dealt with.)

Propagation.

In the propagation of roses there are two methods employed, that of cuttings and by budding. The latter, which is more generally used by nurserymen, was here explained in detail. Some varieties do quite well from cuttings, particulary on sandy soils but generally the briar lends vigour to the plant.

How New Varieties are Obtained.

There are two channels from which we get our new varieties. Sporting is one. By this I mean that for some unknown reason any rose may suddenly produce a rose quite distinct from its original. By working the stem which produces this freak, a new and distinct rose may be obtained. I am sure many hundreds of these sports go begging every year for the want of observance and knowledge. This strange phenomenon may be accounted for by the fact that these new types and/or colours may have been lying dormant for many years. This variation is undoubtedly due to the fact that these peculiarities were at some time associated with the parents' predecessors. Such things were also common regarding the human race. (Mr. Heers here, by the aid of prepared diagrams, described the process of cross hybridisation, taking for example several well-known roses, explaining that on the breeding alone F. K. Druschki may some day be expected to throw a pink sport.)

The second and more scientific method was the raising of varieties from seed. Nature has provided that the rose like all other forms of life must reproduce itself and spread over the earth. It bears small fruit containing seed. These the birds distribute far and wide. The rose itself is hermaphrodite, and is therefore subject to self-pollination. There are two methods of pollination, the first being where the pollen from the stamens (male) falls of its own accord upon its stigmas, and, secondly, cross-pollination where the pollen must be transferred from one distinct flower to another. To bring this about there must be some agent. The inanimate, wind and water, and the animate, birds, insects, &c. Here again for the latter, nature provides the necessary inducements in the rose by the production of sweet foods, scents, waxes, &c., in order that the bee or the bird may get some reward for the work performed. Any new sorts created in this way would be purely the result of chance. Having reached this stage and with the lessons that nature has provided, man is enabled to apply his knowledge in a more direct and scientific manner. As a result of his handiwork, enormous strides have been made in perfecting this most beautiful of all flowers. After describing what should be the aim of the hybridist when setting out on this work, including the care necessary in selecting the parents, Mr. Heers again effectively used black and white sketches to more clearly demonstrate the salient points. These included when and how to remove the petals from the "mother" bloom, then the stamens, pointing out that as this work had to be done prematurely so as to avoid interference, it is necessary to protect the stigma for about three days, when the pollen from the male parent should be carefully transmitted by the aid of a camel hair brush. Again, the pod should be covered with some light material like cheese cloth for at least ten days, when the cross will have taken. Make a record of the cross, and wait for the pod to ripen, when the seeds should be removed from the pod and planted. In the better growing months, those will grow very quickly. In the meantime have a few briars growing, and as soon as an eye shows on the seedling transfer this to the briar and with luck you may see the result of your labour within a month or six weeks, thanks to our wonderful natural conditions. As I said earlier, there will be many disappointments, but these are nothing compared with the reward which must sooner or later come the way of the experimentalist.

KITCHEN GARDEN.

Our notes for October will not vary much from those for September. Sowing may be made of most vegetables. We would not, however, advise the sowing of cauliflowers, as the hot season fast approaching will have a bad effect on their flowering. French beans, including butter beans, may be sown in all parts of the State. Lima and Madagascar beans should also be sown. Sow the dwarf Lima beans in rows 3 feet apart with 18 inches between the plants. The kitchen garden should be deeply dug, and the soil reduced to a fine tilth. Give the plants plenty of room, both in sowing and transplanting, otherwise the plants will be drawn and worthless. Thin out melon and cucumber plants. Spraying for fungoid diseases should be attended to, particularly all members of the *Cucurbitaceæ* and *Solanum* families, of which melons and tomatoes are representative examples. Give plenty of water and mulch tomatoes planted out last month. Asparagus beds will require plentiful watering and a good top-dressing of short manure. See our instructions in "Market Gardening," obtainable on application to the Under Secretary, Department of Agriculture and Stock. Rosella seeds may be sown this months. No farm should be without rosellas. They are easily grown, they bear heavily, they make an excellent preserve, and are infinitely preferable to the mulberry for puddings. The bark supplies a splendid tough fibre for tying up plants. The fruit also makes a delicious wine.

Orchard Notes for October.

THE COASTAL DISTRICTS.

October is frequently a dry month over the greater part of Queensland, consequently the advice that has been given in the notes for August and September regarding the necessity of thorough cultivation to retain moisture is again emphasised. Unless there is an adequate supply of moisture in the soil to meet the trees' requirements, the coming season's crop will be jeopardised, as the young fruit will fail to set.

Thorough cultivation of all orchards, vineyards, and plantations is therefore imperative if the weather is dry, as the soil must be kept in a state of perfect tilth, and no weeds of any kind must be allowed to grow, as they only act as pumps to draw out the moisture from the soil that is required by the trees or fruit-yielding plants. Should the trees show the slightest sign of the want of moisture, they should be given a thorough irrigation if there is any available means of doing so, as it is unwise to allow any fruit trees to suffer for want of water if there is a possibility of their being supplied. Intermittent growth, resulting from the tree or plant being well supplied with moisture at one time and starved at another, results in serious damage, as the vitality is lessened and the tree or plant is not so well able to ward off disease. A strong, healthy, vigorous tree is frequently able to resist disease, whereas when it has become debilitated through neglect, lack of moisture or plant food, it becomes an easy prey to many pests. If an irrigation is given, see that it is a good one and that the ground is soaked; a mere surface watering is often more or less injurious, as it is apt to encourage a false growth which will not last, and also to bring the feeding roots to the surface, where they are not required, as they only die out with a dry spell and are in the way of cultivation. Irrigation should always be followed by cultivation, so as prevent surface evaporation and thus retain the moisture in the soil.

All newly planted trees should be carefully attended to, and if they show the slightest sign of scale insects or other pests they should receive attention at once. All growth not necessary to form the future tree should be removed, such as any growths on the main stem or main branches that are not required, as if this is done now it will not only save work later on, but will tend to throw the whole strength of the tree into the production of those limbs that will form the permanent framework of the tree. In older trees all water sprouts or other similar unnecessary growths should be removed.

Keep a good lookout for scales hatching out, and treat them before they have become firmly established and are coated with their protective covering, as they are very easily killed in their early stages, and consequently much weaker sprays can be used. The best remedies to use for young scales hatching out are those that kill the insects by coming in contact with them, such as miscible oils, which can be applied at a strength of 1 part of oil in 40 parts of spraying material and will do more good than a winter spray of double the strength. In the use of miscible oils or kerosene emulsion, always follow the directions given for the use of those spraying materials, and never apply them to evergreen trees when they are showing signs of distress resulting from a lack of moisture in the soil, as they are then likely to injure the tree, whereas if the tree is in vigorous growth they will do no harm whatever.

All leaf-eating insects should be kept in check by the use of an arsenate of lead spray, taking care to apply it as soon as the damage appears, and not to wait till the crop is ruined. Crops, such as all kinds of cucurbitaceous plants, tomatoes, and potatoes are often seriously injured by these insects, and the loss occasioned thereby can be prevented by spraying in time. In the case of tomatoes and potatoes, a combined spray of Bordeaux or Burgundy mixture and arsenate of lead should be used, as it will serve the dual purpose of destroying leaf-eating insects and of protecting the plants from the attack of Irish blight.

Grape vines require careful attention, and, if not already sprayed with Bordeaux mixture, no time should be lost in applying this material, as the only reliable method of checking such disease as anthracnose or black spot and downy mildew is to protect the wood and foliage from the attack of these diseases by providing a spray covering that will destroy any spores that may come in contact with them. The planting of bananas and pineapples can be continued during this month. See that the land is properly prepared and that good healthy suckers only are used. Keep the plantations well worked, and allow no weed growth. Keep a very careful lookout for fruit flies; destroy every mature insect you can, and gather and destroy

every fallen fruit. If this is done systematically by all growers early in the season the subsequent crop of flies will be very materially decreased. See that all fruit sent to market during the month is carefully handled, properly graded, and well packed—not topped, but that the sample right through the case or lot is the same as that of the exposed surface.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

Much of the matter contained under the heading of "The Coastal Districts" applies equally to these parts of the State; for on the spring treatment that the orchard and vineyard receives the succeeding crop of fruit is very largely dependent. All orchards and vineyards must be kept in a state of perfect tilth, and no weed growth of any kind should be allowed. In the Western districts, irrigation should be given whenever necessary, but growers should not depend on irrigation alone, but should combine it with the thorough cultivation of the land so as to form and keep a fine soil mulch that will prevent surface evaporation.

All newly planted trees should be carefully looked after, and only permitted to grow the branches required to form the future tree. All others should be removed as soon as they make their appearance. If there is any sign of woolly aphis, peach aphis, or scale insects, or of any fungus diseases on the young trees, these diseases should be dealt with at once by the use of such remedies as black leaf forty, Bordeaux mixture, or a weak oil emulsion. In older trees, similar pests should be systematically fought, as if kept in check at the beginning of the season the crop of fruit will not suffer to any appreciable extent. Where brown rot has been present in previous years, two or more sprayings with Bordeaux mixture can be tried, as they will tend to check other fungus growths, but at the same time the sodium or potassium sulphide sprays are more effectual for this particular disease and should be used in preference when the fruit is nearly full grown. All pear, apple, and quince trees should be sprayed with arsenate of lead—first when the blossom is falling, and at intervals of about three weeks. Spraying for codlin moth is compulsory in the fruit district of Stanthorpe, and wherever pomaceous fruit is grown it must be attended to if this insect is to be kept in check.

In the warmer parts a careful check should be kept for any appearance of the fruit fly, and, should it be found, every effort should be made to trap the mature insect and to gather and destroy any affected fruit. If this is done, there is a good chance of saving the earlier ripening summer fruit, if not the bulk of the crop. Tomato and potato crops will require spraying with Bordeaux mixture, as also will grape vines. Keep a very strict watch on all grape vines, and, if they have not already been treated, don't delay a day in spraying if any sign of an oil spot, the first indication of downy mildew, appears on the top surface of the leaf. Spraying with Bordeaux mixture at once, and following the first spraying up with subsequent sprayings, if necessary, will save the crop, but if this is not done and the season is favourable for the development of the particular fungus causing this disease, growers can rest assured that their grape crop won't take long to harvest.

Where new vineyards have been planted, spraying is also very necessary, as if this is not done the young leaves and growth are apt to be so badly affected that the plant dies.

Farm Notes for October.

Field.—With the advent of warmer weather and the consequent increase in the soil temperature, weeds will make great headway if not checked; therefore, our advice for last month holds good wtth even greater force for the coming month. Earth up any crops which may require it, and keep the soil loose among them. Sow maize, cowpeas, sorghums, millet, panicums, pumpkins, melons, cucumbers, marrows. Plant sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, and ginger. Coffee plants may be planted out. There are voluminous articles in previous journals giving full instructions how to manage coffee plants from preparing the ground to harvesting the crop, to which our readers are referred.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

	September, 1930.		October, 1930.		MOONRISE. Sept., 1930.	Oct. 1930.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
					a.m.	p.m.
1	6.10	5.34	5.36	5.48	11 29	12.1
					p.m.	
2	6.9	5.34	5.35	5.48	12.21	12.58
3	6.8	5.35	5.34	5.49	1.14	1.52
4	6.7	5.35	5.33	5.50	2.8	2.45
5	6.6	5.36	5.32	5.50	3.5	3.39
6	6.5	5.36	5.31	5.51	4.0	4.33
7	6.4	5.37	5.29	5.51	4.53	5.25
8	6.3	5.37	5.28	5.52	5.47	6.21
9	6.2	5.38	5.27	5.52	6.39	7.18
10	6.0	5.38	5.26	5.53	7.31	8.15
11	5.59	5.39	5.25	5.53	8.25	9.17
12	5.58	5.39	5.24	5.54	9.21	10.19
13	5.56	5.40	5.23	5.54	10.22	11.19
14	5.55	5.40	5.22	5.55	11.23	...
						a.m.
15	5.54	5.41	5.21	5.55	...	12.20
					a.m.	
16	5.53	5.41	5.20	5.56	12.25	1.15
17	5.52	5.42	5.19	5.56	1.27	2.7
18	5.51	5.42	5.18	5.57	2.28	2.49
19	5.50	5.43	5.17	5.58	3.24	3.26
20	5.48	5.43	5.16	5.58	4.12	4.0
21	5.47	5.43	5.15	5.59	4.53	4.35
22	5.46	5.43	5.14	5.59	5.30	5.9
23	5.45	5.44	5.13	6.0	6.9	5.46
24	5.44	5.44	5.12	6.1	6.40	6.25
25	5.43	5.45	5.12	6.1	7.14	7.10
26	5.42	5.45	5.11	6.2	7.53	8.2
27	5.40	5.46	5.10	6.3	8.34	8.56
28	5.39	5.46	5.9	6.3	9.21	9.52
29	5.38	5.47	5.8	6.4	10.16	10.46
30	5.37	5.47	5.7	6.5	11.7	11.44
31	...	...	5.6	6.6	...	12.40

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhat about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Phases of the Moon, Occultations, &c.

8 Sept.	○	Full Moon	12 47 p.m.
16 „	☽	Last Quarter	7 12 a.m.
22 „	●	New Moon	9 41 p.m.
30 „	☾	First Quarter	12 57 a.m.

Apogee, 6th September, at 7.54 a.m.
Perigee, 21st September, at 2.54 p.m.

It will be interesting to notice the apparent nearness of the planets Mars and Jupiter to one another between 2 and 5 a.m. near the end of the month. Mars will pass from west to east of Jupiter on the 27th. They will appear to be in the constellation Gemini, about 10 degrees southward of Castor and Pollux. The position of the newly discovered 9th Planet is now charted as very near this position of Mars and Jupiter.

Mercury will set at 7.33 p.m. on 1st September; on the 15th it will set at 6.40 p.m.

Venus will set at 9.11 p.m. on the 1st and at 9.16 p.m. on the 15th.

Mars will rise at 2.15 a.m. on the 1st and at 1.57 a.m. on the 15th.

Jupiter will rise at 3.0 a.m. on the 1st and at 2.14 a.m. on the 15th.

Saturn will rise at 12.43 a.m. and set at 2.27 a.m. on the 1st; on the 15th it will rise at 11.45 a.m. and set at 1.32 a.m.

The Southern Cross will reach the western side of the circle in the sky, which it describes daily, about 8 p.m. at the beginning of the month, and about 6 p.m. at the end. It will be noticeably far away to the right (60 degrees) of the position it occupied 6 months ago. The same distance (60 degrees) lies between its position when erect and that when reversed and below the southern horizon in Queensland.

8 Oct.	○	Full Moon	4 56 a.m.
15 „	☽	Last Quarter	3 12 p.m.
22 „	●	New Moon	7 48 a.m.
29 „	☾	First Quarter	7 22 p.m.

Apogee, 3rd October, at 6.54 p.m.
Perigee, 19th October, at 5.42 p.m.
Apogee, 31st October, at 12.18 p.m.

The Moon will be partially eclipsed between 4.46 a.m. and 5.27 a.m. on 8th October. It will also cause an eclipse of the Sun on the 22nd between 6.18 a.m. and 7.40 a.m. At 7 o'clock the Moon will cover one-quarter of the Sun's disc.

Mercury will be at its greatest elongation, 18 degrees west, on 7th October.

Remarkably few of the usual phenomena will be visible in Queensland during this month, such as conjunction of planets with the Moon.

On the 15th Jupiter will be passed by the Moon at 11 a.m., and Mars 14 hours later.

Neptune will be passed on the 18th at 3 p.m.; Mercury also in daylight on the 21st at noon. Venus will be passed on the 25th at 1 a.m. when below the horizon, and Saturn on the 27th at 11 a.m.

Mercury will rise at 4.39 a.m. on the 1st, and at 4.45 a.m. on the 15th.

Venus will set at 8.20 p.m. on the 1st, and at 8.11 p.m. on the 15th.

Mars will rise at 1.33 a.m. on the 1st and at 1.8 a.m. on the 15th.